LEGEND

- Sand and gravel
- Clay and silt
- NAPL potentially present
- Monitoring well wholly or partially screened in this elevation interval
- Data points used in this analysis
- Limits of confidence in stratigraphic interpolation

Notes:

1. A simplifying assumption was made that, for each 5 foot horizontal slice, a total of one foot of sand represented a potentially significant pathway. Thus, areas on the map identified as sand and gravel have a minimum of one foot of sand or gravel in that 5 foot horizontal slice.
2. Contouring accomplished using the minimum curvature method in Surfer v. 7.
3. Cross-hatched regions are horizontal slices through a volume of space bounded by the top of NAPL and base of NAPL surfaces. NAPL is known to exist somewhere, but not necessarily everywhere, within the cross-hatched region, because NAPL is known to be present above and below this region.
4. Data from 0 to -100 feet are limited to quantitative SCAPS results. Due to limited data below -100 feet, all available boring logs, SCAPS data, and geophysical logs were used. The limits of the bounding area reflect variations in quantity and quality of data.

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McCormick and Baxter
Superfund Site
FY00 NAPL Investigation

Simplified Conceptual Geology
5 Foot Thick Horizontal Slice
-185 to -190 Feet Elevation

STOCKTON	**Figure 5-38**	CALIFORNIA

LEGEND

- Sand and gravel
- Clay and silt
- NAPL potentially present
- Monitoring well wholly or partially screened in this elevation interval
- Data points used in this analysis
- Limits of confidence in stratigraphic interpolation

Notes:

1. A simplifying assumption was made that, for each 5 foot horizontal slice, a total of one foot of sand represented a potentially significant pathway. Thus, areas on the map identified as sand and gravel have a minimum of one foot of sand or gravel in that 5 foot horizontal slice.
2. Contouring accomplished using the minimum curvature method in Surfer v. 7.
3. Cross-hatched regions are horizontal slices through a volume of space bounded by the top of NAPL and base of NAPL surfaces. NAPL is known to exist somewhere, but not necessarily everywhere, within the cross-hatched region, because NAPL is known to be present above and below this region.
4. Data from 0 to -100 feet are limited to quantitative SCAPS results. Due to limited data below -100 feet, all available boring logs, SCAPS data, and geophysical logs were used. The limits of the bounding area reflect variations in quantity and quality of data.

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SEATTLE DISTRICT

McCormick and Baxter
Superfund Site
FY00 NAPL Investigation

Simplified Conceptual Geology
5 Foot Thick Horizontal Slice
-190 to -195 Feet Elevation

STOCKTON	**Figure 5-39**	CALIFORNIA

LEGEND

- Sand and gravel
- Clay and silt
- NAPL potentially present
- Monitoring well wholly or partially screened in this elevation interval
- Data points used in this analysis
- Limits of confidence in stratigraphic interpolation

Notes:

1. A simplifying assumption was made that, for each 5 foot horizontal slice, a total of one foot of sand represented a potentially significant pathway. Thus, areas on the map identified as sand and gravel have a minimum of one foot of sand or gravel in that 5 foot horizontal slice.
2. Contouring accomplished using the minimum curvature method in Surfer v. 7.
3. Cross-hatched regions are horizontal slices through a volume of space bounded by the top of NAPL and base of NAPL surfaces. NAPL is known to exist somewhere, but not necessarily everywhere, within the cross-hatched region, because NAPL is known to be present above and below this region.
4. Data from 0 to -100 feet are limited to quantitative SCAPS results. Due to limited data below -100 feet, all available boring logs, SCAPS data, and geophysical logs were used. The limits of the bounding area reflect variations in quantity and quality of data.

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McCormick and Baxter
Superfund Site
FY00 NAPL Investigation

Simplified Conceptual Geology
5 Foot Thick Horizontal Slice
-195 to -200 Feet Elevation

STOCKTON	**Figure 5-40**	CALIFORNIA

NOTES:

1. Contour values represent estimated top of NAPL elevation (feet NVD 88).
2. Contour interval is 10 feet.
3. Countours were computer-generated by SURFER using Kriging. Countours are based only on data points shown and may not represent actual conditions near boundaries of drawing.
4. Sample locations without an elevation value were not used either because boring/push was too shallow to show total NAPL thickness or data too sparse to reliably estimate NAPL elevations.

LEGEND

- Maximum horizontal extent of interpreted NAPL. Dashed where NAPL extent uncertain.

SE 58
7.0
- Sample location with top of NAPL elevation in feet (NVD 88).

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MC CORMICK & BAXTER SUPERFUND SITE
SITE INVESTIGATION

Figure 5-41

TOP OF NAPL ELEVATION (feet NVD 88)

STOCKTON CALIFORNIA

NOTES:

1. Contour values represent estimated base of maximum NAPL elevation (feet NVD 88).
2. Contour interval is 20 feet.
3. Countours were computer-generated by SURFER using Kriging. Countours are based only on data points shown and may not represent actual conditions near boundaries of drawing.
4. Sample locations without an elevationvalue were not used either because boring/push was too shallow to show total NAPL thickness or data too sparse to reliably estimate NAPL thickness

LEGEND

- Maximum horizontal extent of interpreted NAPL. Dashed where NAPL extent uncertain.

SE 58
7.0
- Sample location base of maximum NAPL elevation in fee (NVD 88)t.

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MC CORMICK & BAXTER SUPERFUND SITE
SITE INVESTIGATION

Figure 5-42

ELEVATION OF BASE OF MAXIMUM NAPL (feet NVD 88)

STOCKTON CALIFORNIA

LEGEND

- Maximum horizontal extent of interpreted NAPL. Dashed where NAPL extent uncertain.

SE 58
7.0
- Sample location base of NAPL elevation in feet (NVD 88).

NOTES:

1. Contour values represent estimated base of NAPL elevation. Grid values deeper than -100 feet NVD 88 were normalized to -100 feet NVD 88.
2. Contour interval is 20 feet.
3. Countours were computer-generated by SURFER using Kriging. Countours are based only on data points shown and may not represent actual conditions near boundaries of drawing.
4. Sample locations without an elevation value were not used either because boring/push was too shallow to show total NAPL thickness or data too sparse to reliably estimate NAPL thickness

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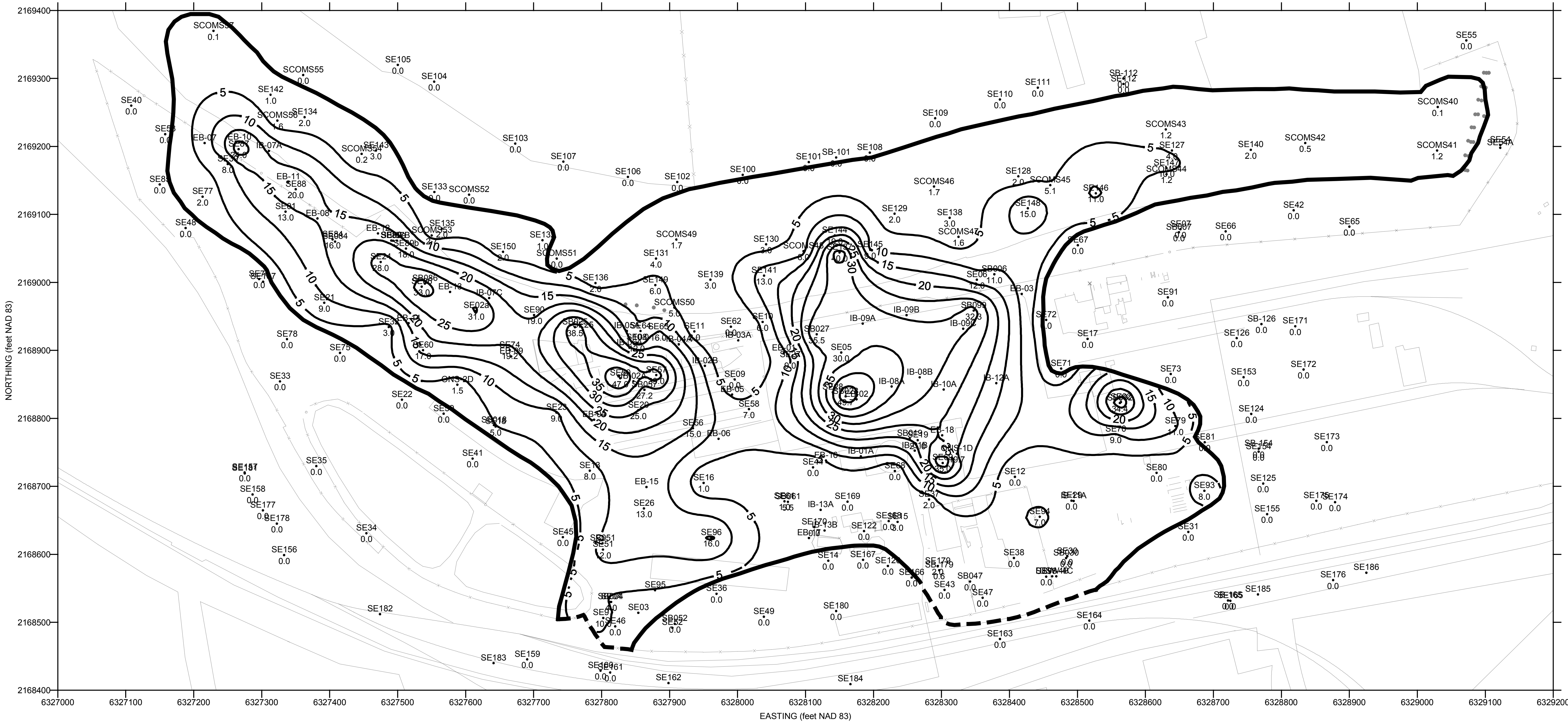
SITE INVESTIGATION

Figure 5-43

BASE OF NAPL GREATER THAN -100 ELEVATION (feet NVD 88)

STOCKTON CALIFORNIA



LEGEND

- Maximum horizontal extent of interpreted NAPL. Dashed where NAPL extent uncertain.

SE 58
7.0
- Sample location with net NAPL thickness in feet.

NOTES:

1. Contour values represent estimated summed thickness of NAPL bearing soil .
2. Contour interval is 5 feet.
3. Countours were computer-generated by SURFER using Kriging. Countours are based only on data points shown and may not represent actual conditions near boundaries of drawing.
4. Sample locations without a thickness value were not used either because boring/push was too shallow to show total NAPL thickness or data too sparse to reliably estimate NAPL thickness

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MC CORMICK & BAXTER SUPERFUND SITE
SITE INVESTIGATION

Figure 5-44

NET THICKNESS OF NAPL BEARING SOIL (feet)

STOCKTON CALIFORNIA

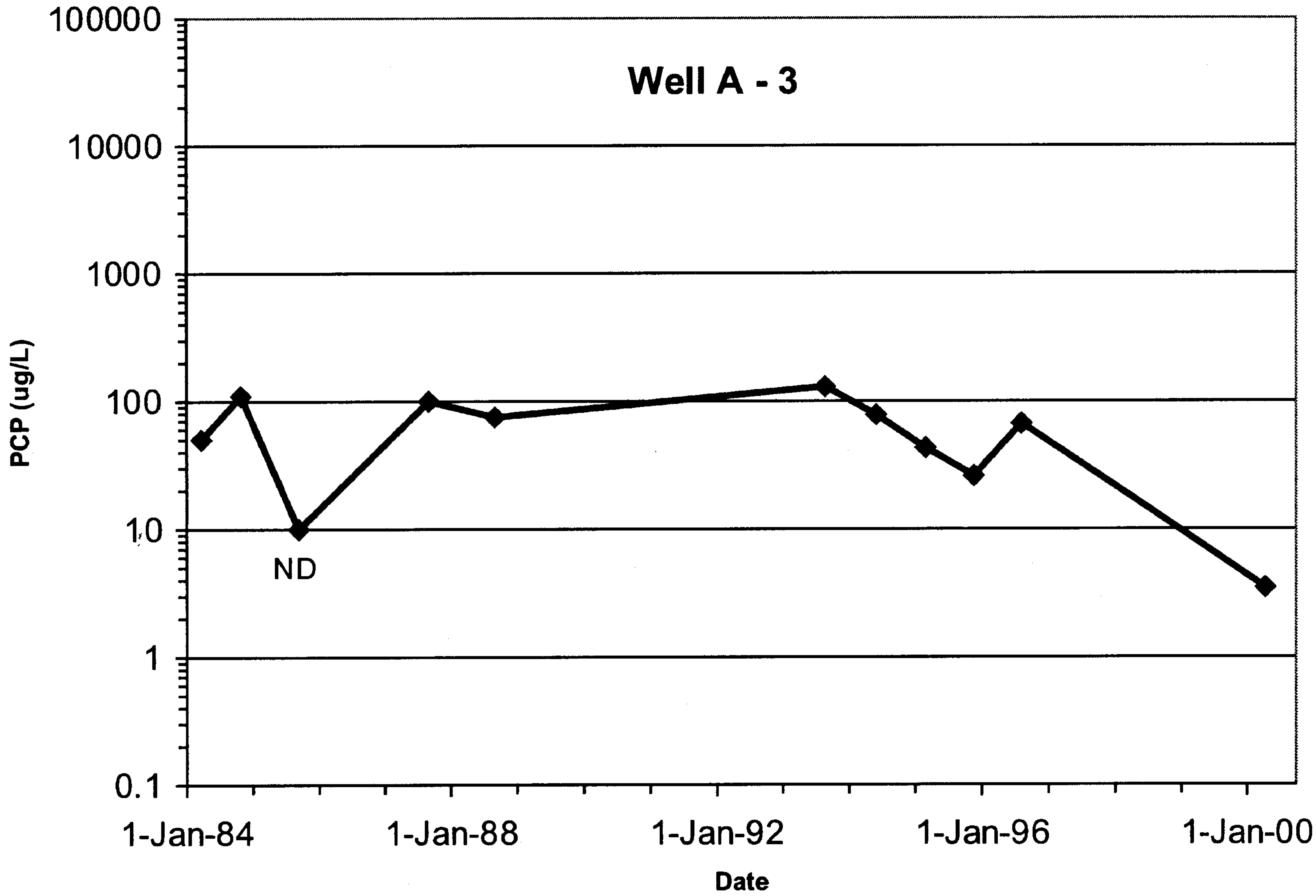

Figure 5-45
PCP Concentrations Over Time for Well A-3

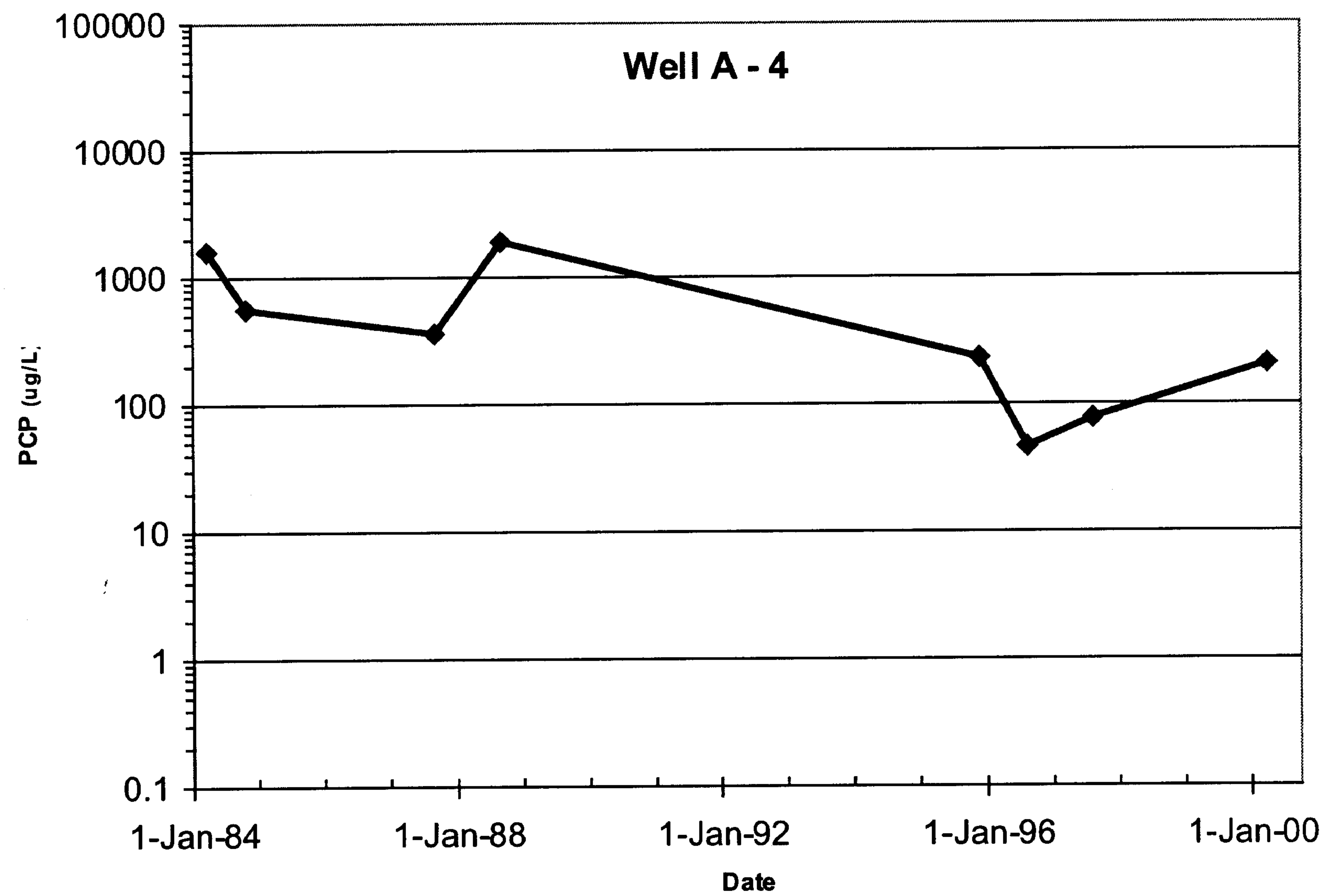

Figure 5-46
PCP Concentrations Over Time for Well A-4

2000 NAPL FIELD INVESTIGATION REPORT
McCormick and Baxter Superfund Site
Stockton, California

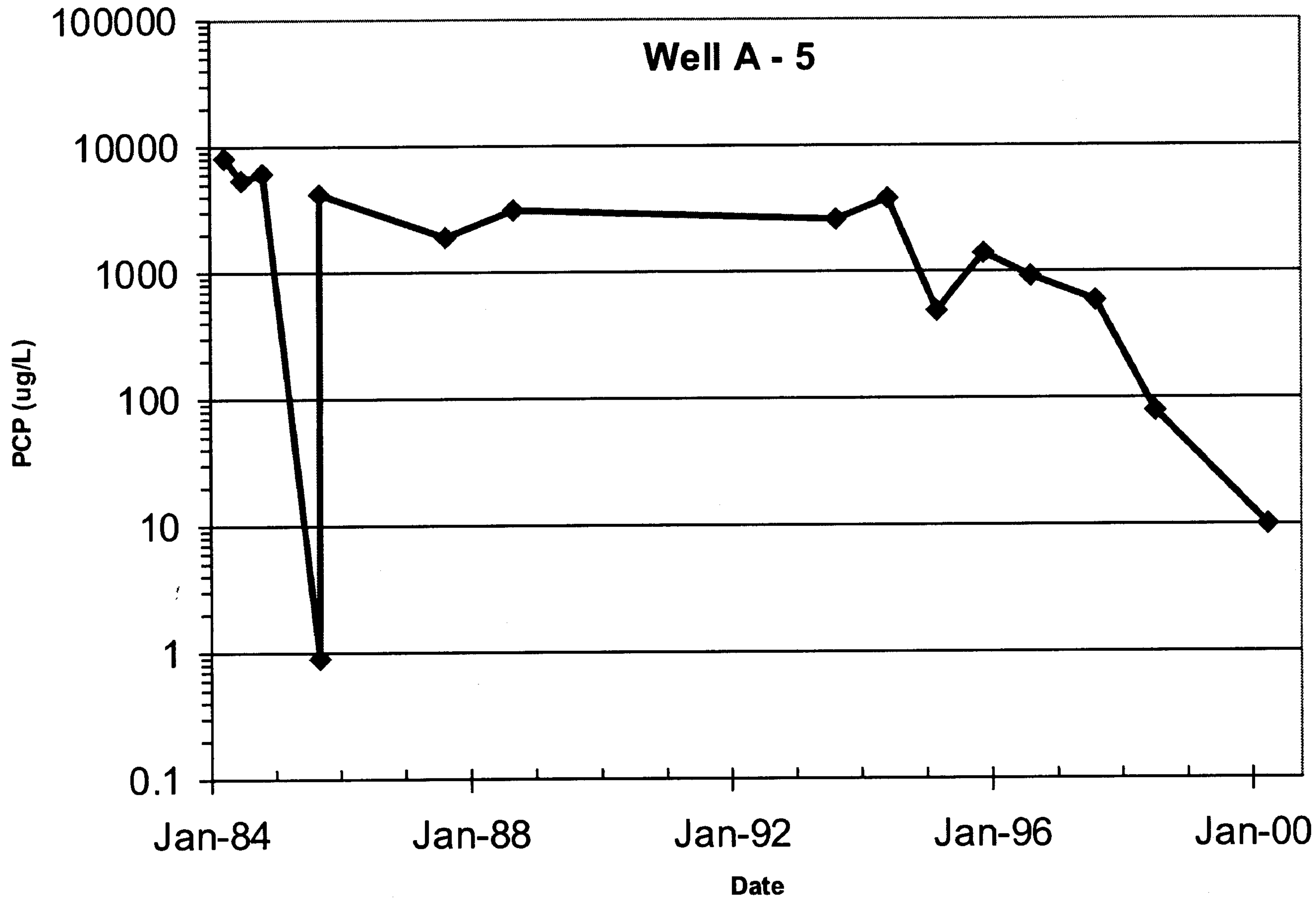

Figure 5-47
PCP Concentrations Over Time for Well A-5

2000 NAPL FIELD INVESTIGATION REPORT
McCormick and Baxter Superfund Site
Stockton, California

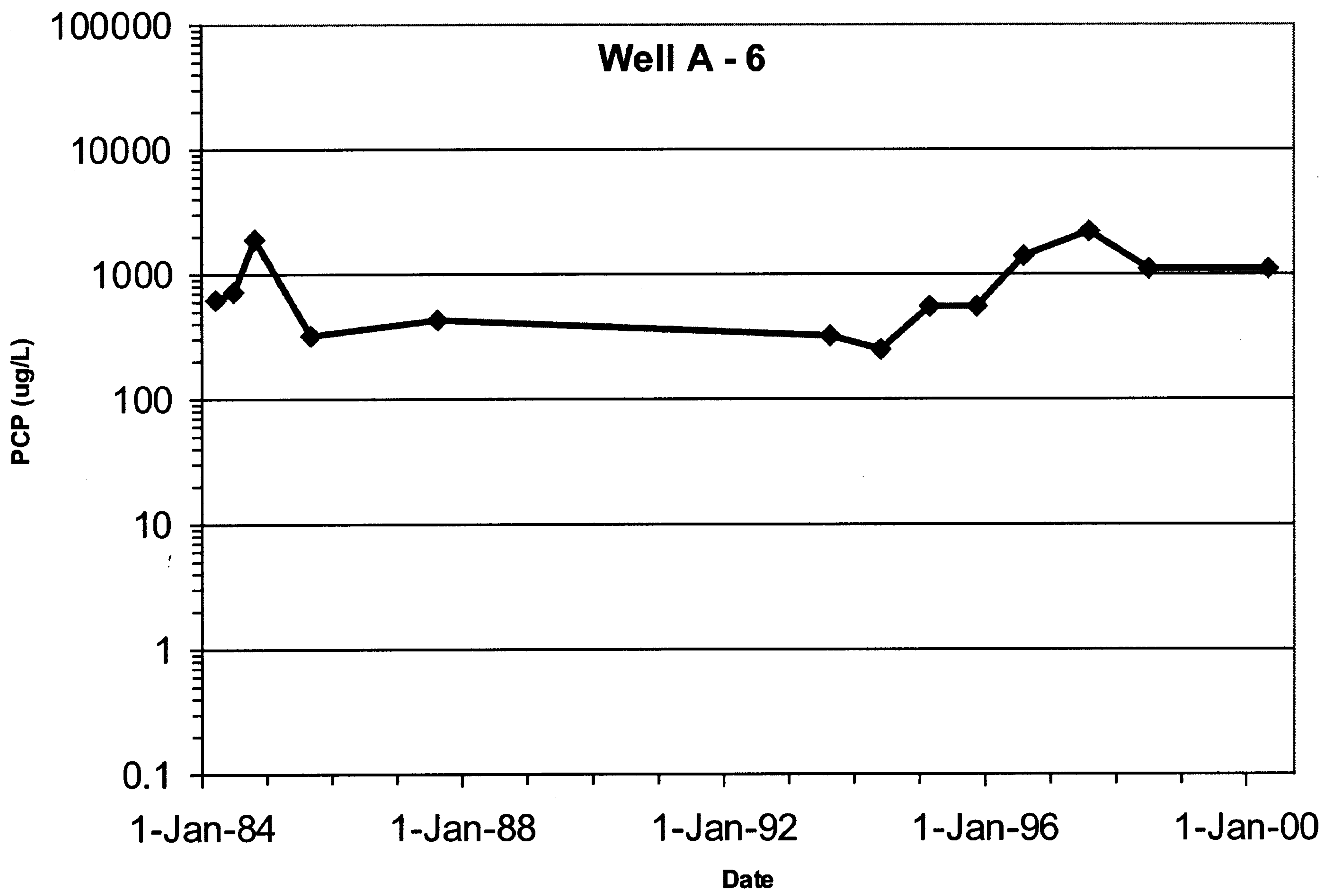

Figure 5-48
PCP Concentrations Over Time for Well A-6

2000 NAPL FIELD
INVESTIGATION REPORT
McCormick and Baxter Superfund Site
Stockton, California

Table 5-1
Water Supply Well—Interviews and Findings

Agency/Company	Contact	Status
City of Stockton 209-937-7037	Doug Jones 209-937-8782	The water for the City of Stockton is supplied by three sources: 1) City of Stockton - Their wells are over 3 miles away from the McCormick and Baxter Superfund site. 2) California Water Service - Supplies the majority of the drinking water for the City of Stockton. - The majority of their wells are over 2 miles away from the McCormick and Baxter Superfund site (see below). 3) San Joaquin County - Supplies less than 1 percent of Stockton's water. - Their wells are over 3 miles away from the McCormick and Baxter Superfund site.
California Water Service 209-466-8971	Eric Marr 209-464-8311	One supply well in proximity to site; all other wells greater than 2 miles away. The supply well has been inactive for 25 years (it has no pump on it), due to the high salinity of the groundwater. Water levels were measured until 1990.
Department of Water Resources (DWR)	Bob Niblack, Engineering Geologist 916-227-7601	They have well log information but an appointment must be made to research the information (Brian, 255-3076). Bob worked on the McCormick and Baxter site 10 years ago and suggested reviewing the Regional Water Quality Control Board's files for supply well data instead of DWR. Bob also suggested contacting San Joaquin County Flood Control and Water Conservation, located in Stockton.
San Joaquin County Flood Control and Water Conservation	209-468-3000	They claimed no active pumping wells are in the area and referred us to DWR.
Regional Water Quality Control Board (RWQCB)	Pat Leary 916-255-3023	On February 10, 1999, a USACE person went through the RWQCB McCormick and Baxter files. No updated information was found; calls were made from an outdated list of companies that once had wells in the surrounding area. The information gathered from these calls is located in this table.
U.S. Naval Reservation	Jim Pinasco 916-255-3719	No response to phone call.
Newark-Sierra (formerly Gold Bond Wood Products)	Mark Vincent 209-466-5251	Newark-Sierra has four supply wells 0.3 mile from the site but only two wells pump at any one time. The other two wells are used as backup wells. Combined the two wells pump 500,000 gallons of water per day. The wells are deeper than 200 feet and could potentially be pumping from the E zone. The wells have been chemically tested and no contamination has ever been detected in these wells. Up until December 1994, Newark Sierra was pumping 2.3 to 3.0 million gallons of water per day and before that, in the late 1980s Newark was pumping 4.5 million gallons of water per day. Mark Vincent is faxing over

Table 5-1 (Continued)
Water Supply Well—Interviews and Findings

Agency/Company	Contact	Status
Newark-Sierra (Continued)	Mark Vincent 209-466-5251	any well data they have on file including a site map showing the location of the wells. He indicated that there were several other "wet" industries southeast of the McCormick and Baxter site that may have supply wells: H.J. Hines, Valley Tomato, Del Monte, Corn Products, and Campbell Soup. Only two of these "wet industries" appear to be active in the area, Valley Tomato and Del Monte.
Port of Stockton	Jay Jagary 209-946-0246 (ext. 290)	The Port of Stockton has no active supply wells and did not know of any in the area.
Valley Tomato	Tom Halloway 209-982-4586 (ext. 405)	Valley Tomato has two supply wells that pump from July 1 through October 1, during tomato harvest. The wells pump approximately 750,000 gallons per day combined. The wells are located adjacent to the Stockton Metropolitan Airport, which is 2 miles from the site.
Del Monte	John Furr 209-466-9011 (ext. 374)	No response to calls.
City of Stockton Haggin Museum	Todd Ruhstaller 209-462-4116	No response to calls.
Nelson Ready Mix Concrete	Russ Nelson 209-466-2884	The company owns one well, 320 feet deep, with the average pumping rate at 6,000 gallons per day, which can vary depending on business. The well is located 4,500 feet southwest of site on West Charter Way.
Ogden Food Products		No longer in business in the Stockton area.
Union Ice/Storage Co.	Larry Titsworth 209-948-0793	Based on past information from Union Ice, there are 12 shallow monitoring wells on this property, but no extraction wells. Union Ice informed EPA that it has used well water in the past, but discontinued such use in approximately 1986.
Stockton Police Department	Jenny Herder, Public Works Director 209-937-8339	The Police Department owns one well 5,400 feet east of the site. The well has been closed at least 5 years with no pumping taking place.

Source: *Management Plan for NAPL Field Exploration* (USACE 1999a).

Table 5-2
Aquifer Zones and Well Screen Elevations

Aquifer Zone	Elevation of Center of Well Screen (feet NVD88)		
	Minimum	Maximum	Average
A	-42	-1	-22
B	-80	-51	-66
C	-135	-108	-116
D	-186	-144	-166
E	-251	-227	-236

Table 5-3
Laboratory Data Summary for Samples of Representative Product Types

Product Type	A	B	C	D	E	F
Sample ID	SV0120 8-10	SV0122 9-11	SS096-63-65	SV0118 13.5-15.3	SB028-9.0-10.1	SV0117 6.5-8.5
Date Sampled	6/28/00	6/26/00	9/9/1999	6/23/00	8/8/1999	6/22/00
Soil Description		silt	sand/silt/clay	silt	clay	sand
NAPL Description		odor	mobile	odor/sheen	nothing	
PCP Screening (mg/kg dry)						
Pentachlorophenol	1 U	63	--	2	--	21,000
Volatiles (mg/kg dry)						
Diisopropyl ether	--	--	--	--	--	57
PAHs (mg/kg dry)						
2-Methylnaphthalene	20 U	--	2,400 J	180	20 U	30 U
Acenaphthene	20 U	20 U	1,100 J	30	20 U	30 U
Acenaphthylene	20 U	20 U	20 U	20 U	20 U	30 U
Anthracene	20 U	20 U	280	20 U	20 U	30 U
Benzo(a)anthracene	20 U	20 U	60	20 U	20 U	30 U
Benzo(a)pyrene	20 U	20 U	20	20 U	20 U	30 U
Benzo(b)fluoranthene	20 U	20 U	20	20 U	20 U	30 U
Benzo(g,h,i)perylene	20 U	20 U	20 U	20 U	20 U	30 U
Benzo(k)fluoranthene	20 U	20 U	10 J	20 U	20 U	30 U
Carbazole	20 U	20 U	120	20 U	20 U	30 U
Chrysene	20 U	20 U	60	20 U	20 U	30 U
Dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U	20 U	30 U
Dibenzofuran	20 U	20 U	600 J	40	20 U	30 U
Fluoranthene	20 U	20 U	500 J	20	20 U	30 U
Fluorene	20 U	20 U	700 J	20	20 U	30 U
Indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U	20 U	30 U
Naphthalene	20 U	20 U	4,500 J	800	20 U	30 U
Pentachlorophenol	60 UJ	50 UJ	60 UJ	60 U	60 U	22,000
Phenanthrene	20 U	20 U	1,400 J	70	20 U	30 U
Pyrene	20 U	20 U	260	10 J	20 U	30 U
TPH Screening (mg/kg dry)						
C10-C11			3,500 J	10	5	
C12-C13	82	620	2,900 J	590	10	
C14-C15	370	720	2,700 J	110	30	
C16-C17	620	1,400	1,800 J	47	180	13,000
C18-C19	64	1,000	1,300 J	47	10	
C20-C21	32	860	700 J	24	9	1,800
C22-C23		140	400 J		5	1,900
C24-C25		210	100 J			
C27-C28			87 J			1,700
C29-C30			34 J			630
C31-C32						1,000
C33-C34						440
C35-C36						150
C37-C39						
Total hydrocarbons	1,200	4,900	13,500	840	250	20,000

Notes:
J - estimated value
U - not detected at reporting limit indicated

Table 5-4
Characteristics of Product Types A Through F

Product Type	Characteristics
A	Distinct double-humped TPH-Dx chromatographic pattern PCP not detected PAH not detected
B	Distinct TPH-Dx pattern from C_{11} to C_{26} PCP detected Low concentrations of PAH relative to TPH-Dx cPAH not detected Diisopropyl ether may or may not be detected
C	Distinct TPH-Dx pattern showing individual PAH peaks but without one compound near C_{10} that appears in type D Closely resembles creosote standard PCP not detected PAH detected cPAH may or may not be detected Diisopropyl ether may or may not be detected
D	Distinct TPH-Dx pattern showing individual PAH peaks including the one compound near C_{10} not in product type C Closely resembles creosote standard PCP may or may not be detected PAH detected cPAH may or may not be detected Diisopropyl ether may or may not be detected
E	Distinct TPH-Dx pattern between C_{16} and C_{18} PCP not detected PAH may or may not be detected Naphthalene not detected cPAH not detected
F	Distinct TPH-Dx pattern from C_{10} to C_{40} PCP detected PAH not detected Diisopropyl ether detected
PCP	Represented by product sample collected from surface soil at location EP-01

Table 5-5
Product Type Assignments and Supporting Chemistry Results

Location ID	Sample ID	Field QC	Product Type	Chemical Concentration (mg/kg)					
				Naphthalene	PCP	Total Hydrocarbons C10-C39	Total PAH (U = 0)	Total cPAHs	Diisopropyl Ether
SE-101	SB101 112-112.5		NE	20 U	60 U	100 U			
SE-101	SB101 131.8-132.3		NE	20 U	60 U	100 U			
SE-101	SB5101 131.8-132.3	Field Duplicate	NE	20 U	60 U	100 U			
SE-101	SB101 142-142.5		NE	20 U	50 U				
SE-101	SB101 142.5-143		NE			100 U			
SE-101	SB101 163.5-164		NE	20 U	60 U	100 U			
SE-101	SB101 192.5-193		NE	20 U	60 U	100 U			
SE-101	SB101 221.5-222		NE	20 U	60 U	100 U			
SE-101	SB101 242.5-243		NE	20 U	60 U	100 U			
SE-102	SS0102 44-45.8		NE	20 U	60 U	100 U			
SE-105	SS0105 2-3.8		NE	400 U	1,000 UJ				
SE-105	SS5105 2-3.8	Field Duplicate	NE	400 U	1,000 UJ				
SE-105	SS0105 6-7.5		NE	400 U	1,000 U				
SE-105	SS0105 10-11.8		NE	500 U	1,000 UJ				
SE-105	SS0105 14-15.8		NE	500 U	1,000 U				
SE-108	SS0108 54-55.8		NE	20 U	60 U	100 U			
SE-109	SS0109 28-30		NE	30 U	70 U	110 U			
SE-109	SS0109 52-53.8		NE	20 U	60 U	100 U			
SE-109	SS0109 60-61.8		NE	20 U	60 U	100 U			
SE-109	SS5109 60-61.8	Field Duplicate	NE	20 U	60 U	100 U			
SE-112	SB0112 64-64.5		NE	20 U	60 U	100 U			
SE-112	SB0112 82-82.5		NE	10 J	60 U	100 U	10		
SE-112	SB0112 105.5-106		NE	20 U	60 U	100 U			
SE-112	SB0112 129-129.5		NE	20 U	50 U	100 U			
SE-112	SB0112 151-151.5		NE	20 U	60 U	100 U			
SE-112	SB5112 151-151.5	Field Duplicate	NE	20 U	60 U	110			
SE-112	SB0112 169-169.5		NE	20 U	50 U	100 U	20		
SE-112	SB0112 189.0-189.5		NE	20 U	60 U	100 U			
SE-112	SB0112 198.0-198.5		NE	30 U	70 U	100 U			
SE-112	SB0112 224.5-225.0		NE	20 U	60 U	100 U			
SE-112	SB0112 236.5-237.0		NE	20 U	60 U	100 U			
SE-113	SS0113 2-3.8		NE	400 U	1,000 UJ				
SE-113	SS0113 6-7.8		NE	400 U	1,000 U				
SE-113	SS0113 10-11.8		NE	500 U	1,000 UJ				
SE-113	SS0113 14-15.8		NE	500 U	1,000 U				
SE-114	SV0114 16-17.1		NE		1 U				10 U
SE-114	SV0114 18-20		NE		1 U				10 U
SE-114	SV0114 20-22		NE		1 U				10 U
SE-114	SV0114 22-24		NE		1 U				10 U
SE-114	SV0114 24-25.5		NE		1 U				10 U
SE-114	SV5114 24-25.5	Field Duplicate	NE		1 U				10 U
SE-114	SV0114 26-28		NE		1 U				10 U
SE-114	SV0114 30-31.3		NE		0.7 J				10 U
SE-114	SV0114 32-33.7		NE		1				8 J
SE-114	SV0114 34-36		NE		1				10 U
SE-114	SV0114 36-38		NE		1				7 J
SE-114	SV0114 38-40		NE		1				10 U

Table 5-5 (Continued)
Product Type Assignments and Supporting Chemistry Results

Location ID	Sample ID	Field QC	Product Type	Chemical Concentration (mg/kg) Naphthalene	PCP	Total Hydrocarbons C10-C39	Total PAH (U = 0)	Total cPAHs	Diisopropyl Ether
SE-115	SV0115 9.5-11.5		NE		1 U				10 U
SE-115	SV0115 11.5-13.5		NE		1 U				10 U
SE-115	SV0115 13.5-15.5		NE		1 U				10 U
SE-115	SV0115 15.5-17.5		NE		1 U				10 U
SE-115	SV0115 17.5-19.5		NE		1 U				10 U
SE-115	SV0115 19.5-21.5		NE		1 U				10 U
SE-115	SV0115 21.5-23.5		NE		1 U				10 U
SE-115	SV5115 21.5-23.5	Field Duplicate	NE		1 U				10 U
SE-115	SV0115 23.5-25.5		NE		1 U				10 U
SE-115	SV0115 25.5-27.5		NE		1 U				10 U
SE-115	SV0115 27.5-29.5		NE		1 U				10 U
SE-115	SV0115 29.5-30.3		NE		1 U				10 U
SE-115	SV0115 31.5-33.5		NE		1 U				10 U
SE-115	SV0115 33.5-35.5		NE		1 U				10 U
SE-115	SV0115 35.5-37.5		NE		1 U				10 U
SE-115	SV0115 37.5-39.5		NE		1 U				10 U
SE-116	SV0116 16-18		NE		1 U				10 U
SE-116	SV0116 18-20		NE		1 U				10 U
SE-116	SV0116 20-22		NE		1 U				10 U
SE-116	SV0116 22-23		NE		1 U				10 U
SE-116	SV0116 24-26		NE		1 U				10 U
SE-116	SV5116 24-26	Field Duplicate	NE		1 U				10 U
SE-116	SV0116 28-30		NE		1 U				10 U
SE-116	SV0116 30-32		NE		1 U				500 U
SE-116	SV0116 32-34		NE		1 U				10 U
SE-116	SV0116 34-36		NE		1 U				10 U
SE-116	SV0116 36-38		NE		1 U				10 U
SE-116	SV0116 38-40		NE		1 U				10 U
SE-117	SV0117 6.5-8.5		**F**	30 U	22,000	20,000	22,000		57,000
SE-117	SV0117 8.5-10.5		**F**		13,000	2,400			58,000
SE-117	SV0117 10.5-12.5		NE	20 U	1,200 U	100 U			2,900
SE-117	SV5117 10.5-12.5	Field Duplicate	NE	20 U	100 U	100 U			3,000
SE-117	SV0117 12.5-14.5		**C**	20 U	2,500	100	180		3,000
SE-117	SV0117 14.5-16.5		**C**		5,200	300			1,500
SE-117	SV0117 16.5-18.5		**C**	20	50	80 J	30		130
SE-117	SV0117 18.5-20.3		NE	30 U	180	100 U	180		500 J
SE-117	SV0117 20.5-22.3		NE	30 U	2 U	100 U			410 J
SE-117	SV0117 22.5-24.3		NE	20 U	1 U	100 U			600 J
SE-118	SV0118 3.5-4.3		NE	20 U	400	75 J	320		980
SE-118	SV0118 5.5-6.2		NE	20 U	60	100 U			1,000 J
SE-118	SV0118 7.5-8.9		NE	30 U	70	100 U			1,000
SE-118	SV0118 10.1-10.7		NE	20 U	60	100 U			520 J
SE-118	SV0118 11.5-13.3		**D**	20 U	60 J	53 J	40		120
SE-118	SV0118 13.5-15.3		**D**	800	60	840	1,170		20
SE-118	SV5118 13.5-15.3	Field Duplicate	**D**	340	1 U	920	600		20
SE-118	SV0118 15.5-17.3		**D**	20 J	0.9 U	67 J	20		80

Table 5-5 (Continued)
Product Type Assignments and Supporting Chemistry Results

Location ID	Sample ID	Field QC	Product Type	Chemical Concentration (mg/kg)					
				Naphthalene	PCP	Total Hydrocarbons C10-C39	Total PAH (U = 0)	Total cPAHs	Diisopropyl Ether
SE-118	SV0118 19.5-21.3		NE	20 U	1 U	100 U			310 J
SE-118	SV0118 23.5-25.3		**D**	30	60	83 J	50		700
SE-119	SV0119 4-6		NE	30 U	26 U	100 U			20 U
SE-119	SV0119 6-8		NE	30 U	30	120 U			100
SE-119	SV0119 8-10		NE	30 U	70	100 U			2,000
SE-119	SV5119 8-10	Field Duplicate	NE	30 U	70	100 U			2,000
SE-119	SV0119 10-12		NE	30 U	60	100 U			2,000
SE-119	SV0119 14-16		NE	30	10 UJ	110	60		400 J
SE-119	SV0119 18-20		NE	20 U	13 U	100 U			800 J
SE-119	SV0119 20-22		NE	30 U	1 U	100 U			1,000 J
SE-119	SV0119 24-26		NE	30 U	100	100 U	100		2,000
SE-119	SV0119 26-28		D	150	60	590	300		2,000
SE-120	SV0120 8-10		**A**	20 U	1 UJ	1,200			10 U
SE-120	SV0120 19-21		**A**	30 U	1 UJ	1,300			10 U
SE-120	SV5120 19-21	Field Duplicate	**A**	20 U	1 UJ	2,400	20		10 U
SE-121	SV0121 9-11		NE		1 U				10 U
SE-121	SV0121 13-14.4		NE		1 U				10 U
SE-121	SV0121 15-17		NE		1 U				10 U
SE-121	SV0121 17-19		NE		1 U				10 U
SE-121	SV0121 19-21		NE		1 U				10 U
SE-121	SV0121 21-23		NE		1 U				10 U
SE-121	SV0121 23-25		NE		1 U				10 U
SE-121	SV0121 25-27		NE		1 U				10 U
SE-121	SV0121 27-29		NE		1 U				10 U
SE-121	SV0121 29-31		NE		1 U				10 U
SE-121	SV0121 31-32.8		NE		1 U				8 J
SE-121	SV0121 35-37		NE		1 U				10 U
SE-121	SV0121 37-39		NE		1 U				10 U
SE-122	SV0122 1-3		**B**		250	2,100			10 U
SE-122	SV0122 3-5		**B**		900	1,100			10
SE-122	SV0122 5-7		**B**		630	2,800			9 J
SE-122	SV0122 9-11		**B**	20 U	50	4,900			160
SE-122	SV0122 11-13		**B**	20 U	65 UJ	780			210
SE-122	SV0122 15-17		NE		37	140			150
SE-122	SV0122 17-19		NE		27	100 U			10 J
SE-122	SV0122 19-21		**B**		84	2,300			10 U
SE-122	SV0122 23-25		NE		23	100 U			7 J
SE-122	SV0122 27-29		NE		34	170			30 J
SE-122	SV0122 29-31		**B**		100	3,900			6 J
SE-122	SV5122 29-31	Field Duplicate	**B**		97	2,700			10 U
SE-122	SV0122 31-33		**B**	30 U	390 J	15,000	460		10
SE-122	SV0122 38-40		NE		1 U	100 U			10 U
SE-123	SV0123 10-12		NE	30 U	60 J	100 U			10 U
SE-123	SV0123 18-20		NE		1 U	100 U			10 U
SE-123	SV0123 32-34		NE			100 U			10 U
SE-123	SV0123 32-34	Field Duplicate	NE		1 U				10 U
SE-126	SB0126 103.0-103.5		NE	20 U	60 U	100 U			10 U

Table 5-5 (Continued)
Product Type Assignments and Supporting Chemistry Results

Location ID	Sample ID	Field QC	Product Type	Chemical Concentration (mg/kg) Naphthalene	PCP	Total Hydrocarbons C10-C39	Total PAH (U = 0)	Total cPAHs	Diisopropyl Ether
SE-126	SB0126 129.0-129.5		NE	20 U	50 U	100 U			10 U
SE-126	SB0126 151.5-152.0		NE	20 U	50 U	100 U			
SE-126	SB0126 176.0-176.5		NE	20 U	60 U	100 U			
SE-126	SB0126 206.0-206.5		NE	20 U	60 U	100 U			
SE-126	SB0126 238.0-238.5		NE	20 U	50 U	100 U			
SE-126	SB5126 238.0-238.5	Field Duplicate	NE	20 U	60 U	100 U			
SE-127	SS0127 43-45			30 U	70 U	2,200	860	140	10 U
SE-133	SS0133 35.6-38		NE	30 U	70 U	100 U			10 U
SE-133	SS0133 38-40		NE	30 U	70 U	100 U			10 U
SE-133	SS0133 40-42		NE	20 U	60 U	100 U			10 U
SE-137	SS0137 20-22		C	380	100 U	1,900	1,140		10 U
SE-137	SS0137 22.7-22.8		C	400,000	200 U		410,500	580	
SE-137	SS0137 22.8-24		C	8,000	80 U	25,000	20,220	1,720	10 U
SE-137	SS0137 25.1-26		C	210	60 U	270	310		10 U
SE-137	SS0137 26.5-28		C	2,000	70 U	6,300	4,420	280	10 U
SE-137	SS5137 26.5-28	Field Duplicate	C	2,600	70 U	4,500	5,780	370	10 U
SE-137	SS0137 30-32		C	1,900	60 U	3,100	3,920	210	10 U
SE-137	SS0137 48-50		NE	20 U	60 U	100 U			10 U
SE-137	SS0137 78-80		NE	20	60 U	100 U	80		10 U
SE-151	SV0151 0.0-1.0		**B**			1,700			10 U
SE-151	SV0151 1-3		NE		1 U	100 U			10 U
SE-151	SV0151 9.0-11.0		**D**	1,200	73	1,100	2230	40	1,000 U
SE-151	SV0151 11.0-13.0		NE	30	12 U	100 U	30		1,000
SE-151	SV0151 13.0-15.0		NE	50	10 U	100 U	60		1,000
SE-151	SV0151 15.0-17.0		**C**	20	60	390	20		4,000
SE-151	SV0151 17.0-19.0		**D**	50	7 U	130	50		4,000
SE-151	SV0151 19.0-21.0		**C**	120	23 U	550	150		4,000
SE-151	SV0151 21.0-23.0		**D**	320	60	1,400	430		1,000
SE-151	SV0151 23.0-25.0		**D**	140	60	600	190		2,000
SE-151	SV5151 23.0-25.0	Field Duplicate	**D**	140	9 U	480	180		2,000
SE-151	SV0151 25.0-27.0		**D**	1,800	60	1,500	2,980	20	2,000 U
SE-151	SV0151 27.0-29.0		**D**	320	7 U	1,500	570		2,000 U
SE-152	SV0152 10-12		NE	20 U	60 U	100 U			20 U
SE-152	SV0152 12-14		NE	20 U	60 U	100 U			10 U
SE-152	SV0152 21-22		NE	20 U	60 U	100 U			80
SE-152	SV0152 24-25.4		NE	20 U	60 U	100 U			140
SE-152	SV0152 26-28		C	30	60 U	1,700	500		230
SE-152	SV5152 26-28	Field Duplicate	C	30 U	1 U	1,400	800		150
SE-153	SS0153 51-53		NE	20 U	60 U	100 U			
SE-153	SS0153 53-55		NE	20 U	60 U	100 U			
SE-154	SB0154 68.5-69.0		NE	20 U	40 U	100 U			
SE-154	SB0154 94.0-94.5		NE	20 U	50 U	100 U			
SE-154	SB0154 113.5-114.0		NE	20 U	60 U	100 U			
SE-154	SB0154 131.5-132.0		NE	20 U	60 U	100 U			
SE-154	SB0154 151.0-152.0		NE	20 U	60 U	100 U			
SE-154	SB5154 151.0-152.0	Field Duplicate	NE	20 U	60 U	100 U			
SE-154	SB0154 179.0-179.8		NE	20 U	60 U	100 U			

Table 5-5 (Continued)
Product Type Assignments and Supporting Chemistry Results

Location ID	Sample ID	Field QC	Product Type	Chemical Concentration (mg/kg)					
				Naphthalene	PCP	Total Hydrocarbons C10-C39	Total PAH (U = 0)	Total cPAHs	Diisopropyl Ether
SE-154	SB0154 202.5-203.0		NE	20 U	60 U	100 U			
SE-154	SB0154 233.0-233.5		NE	20 U	60 U	100 U			
SE-156	SS0156 63-65		NE	20 U	60 U	100 U			
SE-165	SB0165 96-96.5		NE	20 U	60 U	100 U			
SE-165	SB0165 112-112.5		NE	20 U	60 U	100 U			
SE-165	SB0165 126-126.5		NE	20 U	60 U	100 U			
SE-165	SB0165 139-139.5		NE	20 U	60 U	100 U			
SE-165	SB0165 154-154.5		NE	20 U	60 U	100 U			
SE-165	SB0165 167.5-168		NE	20 U	60 U	100 U			
SE-165	SB0165 181-181.5		NE	20 U	60 U	100 U			
SE-165	SB0165 196-196.5		NE	20 U	60 U	100 U			
SE-165	SB0165 227-227.5		NE	20 U	60 U	100 U			
SE-165	SB5165 227-227.5	Field Duplicate	NE	20 U	60 U				
SE-169	SS0169 42-44		NE	20 U	60 U	100 U			
SE-173	SS0173 36-38		NE	20 U	60 U	100 U			
SE-173	SS0173 38-40		NE	20 U	60 U	100 U			
SE-173	SS0173 40-42		NE	20 U	60 U	100 U			
SE-176	SS0176 48-50		NE	20 U	60 U	100 U			
SE-176	SS0176 66-68		NE	20 U	60 U	100 U			
SE-179	SS0179 7-9		**D**	160	60 U	1,600	820	20	
SE-179	SS5179 7-9	Field Duplicate	**D**	210	60 U	2,100	1,010	40	
SE-179	SS0179 65-67		**D**	20	60 U	550	60		
SE-179	SS5179 65-67	Field Duplicate	**D**	50	60 U	520	100		
SE-179	SB0179 72.0-72.3		D	400	60 U	760	840		
SE-179	SB0179 82.0-82.5		NE	20 U	60 U	100 U			
SE-179	SB0179 91.0-91.3		NE	20 U	60 U	100 U			
SE-179	SB0179 101.5-102.0		NE	20 U	60 U	100 U			
SE-179	SB0179 128.5-129		NE	20 U	50 U	100 U			
SE-179	SB0179 143.0-143.5		NE	20 U	60 U	100 U			
SE-179	SB0179 171.0-171.5		NE	20 U	60 U	100 U			
SE-179	SB0179 199.0-199.5		NE	20 U	60 U	100 U			
SE-179	SB0179 238.5-239.0		NE	20 U	50 U	100 U			
SE-179	SB5179 238.5-239	Field Duplicate	NE			100 U			

Notes:
Bold denotes product types assigned from review of TPH-Dx chromatograms
J - estimated value
NE - results could not be evaluated due to low concentrations
U - not detected at reporting limit indicated

Table 5-6
Data Used for NAPL Mapping and Volume Estimates

Location	Ground Elev.[1] NVD88 (feet)	Top NAPL bgs (feet)	Top NAPL NVD88 (feet)	Base Max NAPL bgs (feet)	Base Max NAPL NVD88 (feet)	Net NAPL (feet)	Comments
A-1		ND	NU	SH	NU	NU	
A-2		ND	NU	SH	NU	NU	
A-3		ND	NU	SH	NU	NU	
A-4		ND	NU	SH	NU	NU	
A-5		ND	NU	SH	NU	NU	
A-6		ND	NU	SH	NU	NU	
A-7		ND	NU	SH	NU	NU	
A-8	13.5	ND	NU	SH	NU	NU	
A-9		ND	NU	SH	NU	NU	
A-10		ND	NU	SH	NU	NU	
DSW-1B		ND	NU	ND	NU	NU	Poor sample descriptions
DSW-1C		ND	NU	ND	NU	NU	Poor sample descriptions
DSW-1D		ND	NU	ND	NU	NU	Poor sample descriptions
DSW-2A		ND	NU	ND	NU	NU	Poor sample descriptions
DSW-2B		ND	NU	ND	NU	NU	Poor sample descriptions
DSW-2C		ND	NU	ND	NU	NU	Poor sample descriptions
DSW-2D		ND	NU	ND	NU	NU	Poor sample descriptions
DSW-2E		ND	NU	ND	NU	NU	Poor sample descriptions
DSW-3B		ND	NU	ND	NU	NU	Poor sample descriptions
DSW-3C		ND	NU	ND	NU	NU	Poor sample descriptions
DSW-4B	10.3	65.0	-54.7	NU	NU	NU	Ground surface at top of flush mount top NAPL top of screen
DSW-4C	10.1	NU	NU	NU	NU	NU	Ground surface at top of flush mount top NAPL bottom of screen
DSW-4D		NU	NU	NU	NU	NU	Geophysical log only
DSW-4E		NU	NU	NU	NU	NU	Geophysical log only
DSW-5B		NU	NU	NU	NU	NU	Geophysical log only
DSW-6B		NU	NU	NU	NU	NU	Geophysical log only
DSW-6C		NU	NU	NU	NU	NU	Geophysical log only
DSW-7A		NU	NU	NU	NU	NU	Geophysical log only
DSW-7B		NU	NU	NU	NU	NU	Geophysical log only
DSW-7C		NU	NU	NU	NU	NU	Geophysical log only
OFS-1A		NU	NU	NU	NU	NU	Off-site location - not used
OFS-1B		NU	NU	NU	NU	NU	Off-site location - not used
OFS-1C		NU	NU	NU	NU	NU	Off-site location - not used
OFS-1D		NU	NU	NU	NU	NU	Off-site location - not used
OFS-2A		NU	NU	NU	NU	NU	Off-site location - not used
OFS-2C	7.7	NU	NU	NU	NU	NU	Off-site location - not used
OFS-2D		NU	NU	NU	NU	NU	Off-site location - not used
OFS-3A		NU	NU	NU	NU	NU	Off-site location - not used
OFS-3B		NU	NU	NU	NU	NU	Off-site location - not used
OFS-3C		NU	NU	NU	NU	NU	Off-site location - not used
OFS-3D		NU	NU	NU	NU	NU	Off-site location - not used
OFS-3E		NU	NU	NU	NU	NU	Off-site location - not used
OFS-4A1		NU	NU	NU	NU	NU	Off-site location - not used
OFS-4A2		NU	NU	NU	NU	NU	Off-site location - not used
OFS-4C	7.8	NU	NU	NU	NU	NU	Off-site location - not used
OFS-4D		NU	NU	NU	NU	NU	Off-site location - not used
OFS-4E		NU	NU	NU	NU	NU	Off-site location - not used
OFS-5A		NU	NU	NU	NU	NU	Off-site location - not used

Table 5-6 (Continued)
Data Used for NAPL Mapping and Volume Estimates

Location	Ground Elev.[1] NVD88 (feet)	Top NAPL bgs (feet)	Top NAPL NVD88 (feet)	Base Max NAPL bgs (feet)	Base Max NAPL NVD88 (feet)	Net NAPL (feet)	Comments
OFS-5C	12.7	NU	NU	NU	NU	NU	Off-site location - not used
OFS-5E		NU	NU	NU	NU	NU	Off-site location - not used
ONS-1B		NU	NU	NU	NU	NU	Use ONS-1D only
ONS-1C		NU	NU	NU	NU	NU	Use ONS-1D only
ONS-1D	11.1	6.0	5.1	142.0	-130.9	19.7	Ground elevation average of well top elevations for all ONS-1 wells
ONS-2A		NU	NU	NU	NU	NU	Use ONS-2D only
ONS-2B		NU	NU	NU	NU	NU	Use ONS-2D only
ONS-2C		NU	NU	NU	NU	NU	Use ONS-2D only
ONS-2D	12.9	62.0	-49.1	63.5	-50.6	1.5	Ground elevation average of well top elevations for all ONS-2 wells
OS-1A		NU	NU	NU	NU	NU	Off-site location - not used
OS-1B		NU	NU	NU	NU	NU	Off-site location - not used
OS-1C		NU	NU	NU	NU	NU	Off-site location - not used
OS-1E		NU	NU	NU	NU	NU	Off-site location - not used
OS-2E		NU	NU	NU	NU	NU	Off-site location - not used
OS-3E		NU	NU	NU	NU	NU	Off-site location - not used
OS-4A		NU	NU	NU	NU	NU	Off-site location - not used
OS-4B		NU	NU	NU	NU	NU	Off-site location - not used
OS-4C		NU	NU	NU	NU	NU	Off-site location - not used
OS-5B		NU	NU	NU	NU	NU	Off-site location - not used
OS-5C		NU	NU	NU	NU	NU	Off-site location - not used
OS-5D		NU	NU	NU	NU	NU	Off-site location - not used
OS-6B		NU	NU	NU	NU	NU	Off-site location - not used
OS-6C		NU	NU	NU	NU	NU	Off-site location - not used
OS-6D		NU	NU	NU	NU	NU	Off-site location - not used
GB-5		NU	NU	NU	NU	NU	Off-site location - not used
GB-7		NU	NU	NU	NU	NU	Off-site location - not used
GB-9		NU	NU	NU	NU	NU	Off-site location - not used
GB-10		NU	NU	NU	NU	NU	Off-site location - not used
EB-01	8.0	ND	NU	SH	NU	NU	
EB-02	8.5	24.5	-16.0	SH	NU	NU	Not used, too shallow for full NAPL extent
EB-03	10.6	SH	NU	SH	NU	NU	
EB-04	11.2	SH	NU	SH	NU	SH	
EB-05	11.3	SH	NU	SH	NU	NU	
EB-06	10.8	SH	NU	SH	NU	NU	
EB-07	12.1	SH	NU	SH	NU	NU	
EB-08	11.9	8.5	3.4	SH	NU	NU	Not used, shallow compared to surrounding SCAPS data
EB-09	12.4	ND	NU	SH	NU	NU	
EB-10	11.7	6.5	5.2	SH	NU	NU	Not used, too shallow for full NAPL extent
EB-11	11.6	6.5	5.1	SH	NU	NU	Not used, too shallow for full NAPL extent
EB-12	13.8	ND	NU	SH	NU	NU	
EB-13	12.3	NU	NU	SH	NU	NU	Not used, shallow compared to surrounding SCAPS data
EB-14	12.1	SH	NU	SH	NU	NU	
EB-15	11.2	SH	NU	SH	NU	NU	
EB-16	11.4	SH	NU	SH	NU	NU	
EB-17	9.4	SH	NU	SH	NU	NU	
EB-18	11.1	SH	NU	SH	NU	NU	
EB-19	12.3	SH	NU	SH	NU	NU	
IB-01A	11.3	SH	NU	SH	NU	NU	

Table 5-6 (Continued)
Data Used for NAPL Mapping and Volume Estimates

Location	Ground Elev.[1] NVD88 (feet)	Top NAPL bgs (feet)	Top NAPL NVD88 (feet)	Base Max NAPL bgs (feet)	Base Max NAPL NVD88 (feet)	Net NAPL (feet)	Comments
IB-01B	11.0	0.5	10.5	SH	NU	NU	
IB-02A	11.3	37.0	-25.7	SH	NU	NU	
IB-02B	11.2	33.0	-21.8	SH	NU	NU	
IB-03A	10.8	SH	NU	SH	NU	NU	
IB-04A	11.8	SH	NU	SH	NU	NU	
IB-05A	13.7	25.0	-11.3	SH	NU	NU	
IB-06A	13.1	SH	NU	SH	NU	NU	
IB-07A	14.3	SH	NU	SH	NU	NU	
IB-07B	14.2	NU	NU	SH	NU	NU	Not used, shallow compared to surrounding SCAPS data
IB-07C	14.2	NU	NU	SH	NU	NU	Not used, shallow compared to surrounding SCAPS data
IB-08A	11.8	SH	NU	SH	NU	NU	
IB-08B	12.0	SH	NU	SH	NU	NU	
IB-09A	11.0	7.0	4.0	SH	NU	NU	
IB-09B	10.9	14.0	-3.1	SH	NU	NU	
IB-09C	11.2	4.0	7.2	SH	NU	NU	
IB-10A	11.3	SH	NU	SH	NU	NU	
IB-11A	9.9	SH	NU	SH	NU	NU	
IB-12A	10.8	7.0	3.8	SH	NU	NU	
IB-13A	11.8	ND	NU	SH	NU	NU	
IB-13B	10.1	ND	NU	SH	NU	NU	
SB004	11.0	102.0	-91.0	ND	NU	NU	1.5' net NAPL not used, use SE04 instead
SB006	14.2	52.0	-37.8	163.0	-148.8	11.0	Sheen
SB007	10.7	ND	NU	ND	NU	0.0	
SB018	11.8	ND	NU	ND	NU	NU	No samples 0-80', use SE18 net NAPL
SB019	11.4	NU	NU	128.4	-117.0	NU	Missing sample intervals, 8.4 net NAPL not used
SB025	12.0	SH	NU	ND	NU	38.5	13.5' net NAPL added to 25.0 from SE25 for 38.5' total
SB027	15.4	60.0	-44.6	123.0	-107.6	35.5	
SB028	14.0	27.7	-13.7	126.0	-112.0	49.7	
SB030	9.3	ND	NU	ND	NU	0.0	
SB047	8.9	ND	NU	ND	NU	0.0	
SB051	11.2	50.0	-38.8	ND	NU	NU	Conflict with SE51, bottom may be base of sand at 87
SB052	9.8	ND	NU	ND	NU	0.0	
SB057	11.4	25.0	-13.6	ND	NU	27.2	Top in 20-30 interval, assume 25 from SE57
SB061	10.7	125.0	-114.3	133.5	-122.8	5.5	Minor indication, but agrees with SE61
SB084	12.6	10.0	2.6	ND	NU	NU	8 feet NAPL, but use SE83 for net value
SB086	12.3	SH	NU	SH	NU	NU	NAPL at 17, but no sample 10-17
SB092	10.2	50.0	-39.8	ND	NU	34.4	No samples above 50
SB099	15.0	3.0	12.0	214.5	-199.5	32.3	Agrees with 1B-9C
SB-101	11.6	ND	NU	ND	NU	0.0	
SB-112	9.8	ND	NU	ND	NU	0.0	
SB-126	10.6	ND	NU	ND	NU	0.0	
SB-154	9.5	ND	NU	ND	NU	0.0	
SB-165	7.1	ND	NU	ND	NU	0.0	
SB-179	9.5	71.0	-61.5	72.3	-62.8	0.6	
SCOMS40	-5.7	3.2	-8.9	3.3	-9.0	0.1	
SCOMS41	-5.7	3.6	-9.3	6.3	-12.0	1.2	
SCOMS42	-6.2	2.5	-8.7	4.8	-11.0	0.5	
SCOMS43	-8.5	2.3	-10.8	5.7	-14.2	1.2	
SCOMS44	-7.6	2.3	-9.9	15.1	-22.7	1.2	
SCOMS45	-7.7	1.0	-8.7	10.0	-17.7	5.1	

Table 5-6 (Continued)
Data Used for NAPL Mapping and Volume Estimates

Location	Ground Elev.[1] NVD88 (feet)	Top NAPL bgs (feet)	Top NAPL NVD88 (feet)	Base Max NAPL bgs (feet)	Base Max NAPL NVD88 (feet)	Net NAPL (feet)	Comments
SCOMS46	-5.2	2.8	-8.0	5.5	-10.7	1.7	
SCOMS47	-6.4	1.5	-7.9	3.1	-9.5	1.6	
SCOMS48	-7.1	2.0	-9.1	SH	NU	8.0	
SCOMS49	-9.1	2.0	-11.1	3.7	-12.8	1.7	
SCOMS50	-7.7	2.5	-10.2	SH	NU	5.0	
SCOMS51	-9.3	ND	NU	ND	NU	0.0	
SCOMS52	-7.5	ND	NU	ND	NU	0.0	
SCOMS53	-5.6	1.0	-6.6	5.2	-10.8	2.7	
SCOMS54	-8.8	1.7	-10.5	1.9	-10.7	0.2	
SCOMS55	-6.5	ND	NU	ND	NU	0.0	
SCOMS56	-7.6	1.9	-9.5	3.5	-11.1	1.6	
SCOMS57	-8.9	4.1	-13.0	4.2	-13.1	0.1	
SCOMS58	-8.0	ND	NU	ND	NU	0.0	
SCOMS59	-15.0	ND	NU	ND	NU	0.0	
SCOMS60	-12.1	ND	NU	ND	NU	0.0	
SE01	11.9	10.0	1.9	60.0	-48.1	13.0	
SE01[a]	11.9	NU	NU	NU	NU	NU	Spiky peaks, better results in SE01
SE02	12.2	NU	NU	NU	NU	NU	SE02A deeper with better response
SE02[a]	12.3	23.0	-10.7	86.0	-73.7	31.0	NAPL at 84-86 noted in SS02
SE03	10.5	ND	NU	SH	NU	NU	
SE03[a]	10.5	NU	NU	NU	NU	NU	Response and depth similar to SE03
SE04	11.0	100.0	-89.0	104.0	-93.0	4.0	
SE05	14.8	8.0	6.8	70.0	-55.2	30.0	
SE06	14.0	53.0	-39.0	SH	NU	12.0	
SE07	11.1	ND	NU	ND	NU	0.0	Intervals with sig counts, but no contamination noted in SB007
SE08	13.7	24.0	-10.3	50.0	-36.3	12.0	
SE09	11.3	ND	NU	SH	NU	0.0	
SE10	13.4	59.0	-45.6	SH	NU	6.0	
SE11	14.1	50.0	-35.9	52.0	-37.9	2.0	
SE12	11.0	ND	NU	SH	NU	0.0	
SE13	11.5	60.0	-48.5	68.0	-56.5	8.0	
SE14	10.0	ND	NU	SH	NU	0.0	
SE15	10.7	35.0	-24.3	66.0	-55.3	3.0	
SE16	11.2	43.0	-31.8	SH	NU	1.0	
SE17	11.4	ND	NU	SH	NU	0.0	Minor spike at 15.5' otherwise counts <300
SE18	11.9	50.0	-38.1	63.0	-51.1	5.0	SB18 not sampled until 80'
SE19	11.6	7.0	4.6	SH	NU	21.0	In SB19 deep staining only
SE20	11.3	29.0	-17.7	63.0	-51.7	25.0	
SE21	12.3	50.0	-37.7	SH	NU	9.0	
SE22	12.5	ND	NU	SH	NU	0.0	Counts in 300-500 gray area, adjacent locations show no NAPL
SE23	12.0	28.0	-16.0	83.0	-71.0	9.0	
SE24	12.5	6.0	6.5	73.0	-60.5	28.0	Despite relatively low counts, consider as NAPL due to location
SE25	12.1	18.0	-5.9	83.0	-70.9	NU	25' net NAPL added to SB25
SE26	11.0	37.0	-26.0	76.0	-65.0	13.0	
SE27	15.0	35.0	-20.0	57.0	-42.0	9.0	
SE28	14.1	6.0	8.1	SH	NU	NU	Shallow NAPL in SB28 23' net NAPL not used since Shallow push

Table 5-6 (Continued)
Data Used for NAPL Mapping and Volume Estimates

	Ground Elev.[1]	Top NAPL		Base Max NAPL		Net	
Location	NVD88 (feet)	bgs (feet)	NVD88 (feet)	bgs (feet)	NVD88 (feet)	NAPL (feet)	Comments
SE29	9.8	ND	NU	ND	NU	0.0	
SE30	9.4	SH	NU	ND	NU	0.0	Trace vague staining in SB30 below 80'
SE31	9.8	ND	NU	ND	NU	0.0	
SE32	12.7	44.0	-31.3	47.0	-34.3	3.0	
SE33	13.2	ND	NU	ND	NU	0.0	
SE34	14.2	ND	NU	ND	NU	0.0	
SE35	14.3	ND	NU	ND	NU	0.0	
SE36	10.6	ND	NU	ND	NU	0.0	
SE37	10.5	56.0	-45.5	60.0	-49.5	2.0	Peak at 32'-33' not confirmed with soil sample
SE38	9.3	ND	NU	ND	NU	0.0	
SE39	11.2	10.0	1.2	ND	NU	8.0	
SE40	11.6	ND	NU	ND	NU	0.0	
SE41	12.4	ND	NU	ND	NU	0.0	
SE42	11.5	ND	NU	ND	NU	0.0	Counts < 300
SE43	9.8	2.0	7.8	28.0	-18.2	0.0	Probable diesel contamination, not used for NAPL contours
SE44	11.4	ND	NU	SH	NU	0.0	Very minor response at 100'
SE45	11.6	ND	NU	SH	NU	0.0	
SE46	10.0	ND	NU	SH	NU	0.0	
SE47	8.6	10.4	-1.8	15.0	-6.4	0.0	Probable diesel contamination, not used for NAPL contours
SE48	12.2	ND	NU	ND	NU	0.0	
SE49	10.0	ND	NU	ND	NU	0.0	
SE50	12.1	4.0	8.1	61.0	-48.9	47.0	
SE51	11.4	50.0	-38.6	SH	NU	12.0	Base NAPL may extend below depth of boring?
SE52	10.2	SH	NU	SH	NU	SH	
SE53	11.8	ND	NU	ND	NU	0.0	
SE54	10.0	SH	NU	SH	NU	SH	
SE54A	10.0	SH	NU	SH	NU	SH	
SE55	10.5	ND	NU	ND	NU	0.0	
SE56	11.4	26.0	-14.6	61.0	-49.6	15.0	
SE57	11.5	10.0	1.5	60.0	-48.5	39.0	
SE58	11.5	35.0	-23.5	88.0	-76.5	7.0	
SE59	12.8	ND	NU	ND	NU	0.0	
SE60	12.3	45.0	-32.7	66.0	-53.7	17.0	Eliminated responses at 36 and 92 due to odd wavelength
SE61	11.0	124.0	-113.0	125.0	-114.0	1.0	Deep NAPL at 124' supported by SB-61 and SE44
SE62	14.0	ND	NU	ND	NU	0.0	
SE63	14.1	26.0	-11.9	50.0	-35.9	16.0	
SE64	14.0	30.0	-16.0	62.0	-48.0	10.0	
SE65	11.1	ND	NU	ND	NU	0.0	
SE66	11.5	ND	NU	ND	NU	0.0	
SE67	12.2	ND	NU	ND	NU	0.0	1 spike at 25.69' otherwise counts < 300
SE68	11.5	ND	NU	ND	NU	0.0	
SE69	10.9	4.0	6.9	58.0	-47.1	35.0	
SE70	11.2	54.0	-42.8	63.0	-51.8	9.0	Possible spike at base
SE71	11.0	ND	NU	ND	NU	0.0	
SE72	11.7	ND	NU	SH	NU	0.0	
SE73	10.4	ND	NU	ND	NU	0.0	
SE74	12.7	23.0	-10.3	67.0	-54.3	19.2	
SE75	12.5	ND	NU	ND	NU	0.0	
SE76	12.4	ND	NU	ND	NU	0.0	False spike at 61.5'
SE77	12.2	25.0	-12.8	27.0	-14.8	2.0	

Table 5-6 (Continued)
Data Used for NAPL Mapping and Volume Estimates

Location	Ground Elev.[1] NVD88 (feet)	Top NAPL bgs (feet)	Top NAPL NVD88 (feet)	Base Max NAPL bgs (feet)	Base Max NAPL NVD88 (feet)	Net NAPL (feet)	Comments
SE78	12.9	ND	NU	ND	NU	0.0	
SE79	10.2	50.0	-39.8	SH	NU	11.0	
SE80	10.1	ND	NU	ND	NU	0.0	
SE81	9.6	ND	NU	ND	NU	0.0	Dubious spike 50.4-50.5
SE82	8.5	ND	NU	ND	NU	0.0	
SE83	8.5	ND	NU	ND	NU	0.0	
SE84	12.5	10.0	2.5	SH	NU	16.0	
SE85	12.3	ND	NU	ND	NU	0.0	
SE86	12.4	9.0	3.4	48.0	-35.6	33.0	
SE87	12.1	4.0	8.1	SH	NU	24.0	
SE88	12.1	4.0	8.1	SH	NU	20.0	
SE89	12.5	ND	NU	SH	NU	NU	
SE89a	12.6	ND	NU	SH	NU	NU	
SE89b	12.5	14.0	-1.5	SH	NU	18.0	
SE90	12.2	22.0	-9.8	60.0	-47.8	19.0	
SE91	11.1	ND	NU	SH	NU	0.0	Minor spike at 13' otherwise counts < 300
SE92	9.6	50.0	-40.4	SH	NU	NU	NAPL at 90', might go deeper, 8' net NAPL not used, vs SB92
SE93	9.7	62.0	-52.3	70.0	-60.3	8.0	
SE94	9.7	8.0	1.7	17.0	-7.3	7.0	
SE95	10.9	ND	NU	SH	NU	NU	
SE96	10.6	63.0	-52.4	97.0	-86.4	16.0	
SE97	10.9	87.0	-76.1	102.0	-91.1	10.0	
SE98	9.9	ND	NU	SH	NU	0.0	
SE100	11.0	ND	NU	SH	NU	0.0	
SE101	10.6	ND	NU	SH	NU	0.0	
SE102	15.1	ND	NU	SH	NU	0.0	
SE103	16.0	ND	NU	SH	NU	0.0	
SE104	13.0	ND	NU	SH	NU	0.0	
SE105	12.7	ND	NU	SH	NU	0.0	
SE106	15.5	ND	NU	SH	NU	0.0	
SE107	16.4	ND	NU	SH	NU	0.0	
SE108	11.6	ND	NU	SH	NU	0.0	
SE109	10.3	ND	NU	SH	NU	0.0	
SE110	8.7	ND	NU	SH	NU	0.0	
SE111	8.2	ND	NU	SH	NU	0.0	
SE112	9.8	ND	NU	SH	NU	0.0	
SE113	12.5	ND	NU	SH	NU	0.0	
SE120	9.7	NU	NU	NU	NU	0.0	9 feet of NAPL detected, but not creosote
SE122	10.6	NU	NU	NU	NU	0.0	26 feet of NAPL detected, but not creosote
SE124	9.6	ND	NU	SH	NU	0.0	
SE125	9.4	ND	NU	SH	NU	0.0	
SE126	10.6	ND	NU	SH	NU	0.0	
SE127	10.2	NU	NU	SH	NU	4.0	True top of NAPL in steel pipe, not recorded (barge push)
SE128	9.5	NU	NU	SH	NU	2.0	True top of NAPL in steel pipe, not recorded (barge push)
SE129	10.8	NU	NU	SH	NU	2.0	True top of NAPL in steel pipe, not recorded (barge push)
SE130	10.0	NU	NU	SH	NU	3.0	True top of NAPL in steel pipe, not recorded (barge push)
SE131	9.8	NU	NU	SH	NU	4.0	True top of NAPL in steel pipe, not recorded (barge push)
SE132	12.0	NU	NU	SH	NU	1.0	True top of NAPL in steel pipe, not recorded (barge push)
SE133	12.0	NU	NU	SH	NU	0.0	True top of NAPL in steel pipe, not recorded (barge push)

Table 5-6 (Continued)
Data Used for NAPL Mapping and Volume Estimates

Location	Ground Elev.[1] NVD88 (feet)	Top NAPL bgs (feet)	Top NAPL NVD88 (feet)	Base Max NAPL bgs (feet)	Base Max NAPL NVD88 (feet)	Net NAPL (feet)	Comments
SE134	11.6	NU	NU	SH	NU	2.0	True top of NAPL in steel pipe, not recorded (barge push)
SE135	11.5	NU	NU	SH	NU	2.0	True top of NAPL in steel pipe, not recorded (barge push)
SE136	9.9	NU	NU	SH	NU	2.0	True top of NAPL in steel pipe, not recorded (barge push)
SE137	10.1	20.0	-9.9	SH	NU	40.0	
SE138	10.4	NU	NU	SH	NU	3.0	True top of NAPL in steel pipe, not recorded (barge push)
SE139	10.3	NU	NU	SH	NU	3.0	True top of NAPL in steel pipe, not recorded (barge push)
SE140	9.0	NU	NU	SH	NU	2.0	True top of NAPL in steel pipe, not recorded (barge push)
SE141	10.2	NU	NU	SH	NU	13.0	
SE142	9.1	19.0	-9.9	SH	NU	1.0	
SE143	11.8	24.0	-12.2	SH	NU	3.0	
SE144	9.1	20.0	-10.9	SH	NU	19.0	
SE145	12.0	23.0	-11.0	SH	NU	9.0	
SE146	9.8	20.0	-10.2	SH	NU	11.0	
SE147	12.4	25.0	-12.6	SH	NU	10.0	
SE148	9.9	20.0	-10.1	SH	NU	15.0	
SE149	8.6	20.0	-11.4	SH	NU	6.0	
SE150	12.5	28.0	-15.5	SH	NU	2.0	
SE153	10.1	ND	NU	SH	NU	0.0	
SE154	9.6	ND	NU	SH	NU	0.0	
SE155	9.5	ND	NU	SH	NU	0.0	
SE156	9.0	ND	NU	SH	NU	0.0	
SE157	10.2	ND	NU	SH	NU	0.0	
SE158	9.9	ND	NU	SH	NU	0.0	
SE159	8.6	ND	NU	SH	NU	0.0	
SE160	8.9	ND	NU	SH	NU	0.0	
SE161	9.0	ND	NU	SH	NU	0.0	
SE162	8.9	ND	NU	SH	NU	0.0	
SE163	9.7	ND	NU	SH	NU	0.0	
SE164	9.1	ND	NU	SH	NU	0.0	
SE165	7.1	ND	NU	SH	NU	0.0	
SE166	10.0	NU	NU	SH	NU	0.0	5 feet of NAPL, but not creosote, not used
SE167	9.8	ND	NU	SH	NU	0.0	
SE168	10.6	ND	NU	SH	NU	0.0	
SE169	10.4	ND	NU	SH	NU	0.0	
SE170	10.2	ND	NU	SH	NU	0.0	
SE171	10.5	ND	NU	SH	NU	0.0	
SE172	10.0	ND	NU	SH	NU	0.0	
SE173	9.3	ND	NU	SH	NU	0.0	
SE174	9.5	ND	NU	SH	NU	0.0	
SE175	9.2	ND	NU	SH	NU	0.0	
SE176	6.7	ND	NU	SH	NU	0.0	
SE177	9.7	ND	NU	SH	NU	0.0	
SE178	9.4	ND	NU	SH	NU	0.0	
SE179	9.5	66.0	-56.5	SH	NU	2.0	
SE180	10.1	ND	NU	SH	NU	0.0	
SE181	9.9	NU	NU	NU	NU	NU	No LIF data
SE182	8.1	NU	NU	NU	NU	NU	No LIF data
SE183	8.1	NU	NU	NU	NU	NU	No LIF data
SE184	9.6	NU	NU	NU	NU	NU	No LIF data
SE185	7.1	NU	NU	NU	NU	NU	No LIF data

Table 5-6 (Continued)
Data Used for NAPL Mapping and Volume Estimates

Location	Ground Elev.[1] NVD88 (feet)	Top NAPL bgs (feet)	Top NAPL NVD88 (feet)	Base Max NAPL bgs (feet)	Base Max NAPL NVD88 (feet)	Net NAPL (feet)	Comments
SE186	9.7	NU	NU	NU	NU	NU	No LIF data
SE187	12.4	NU	0.0	NU	0.0	NU	No LIF data
SE188	9.8	62.0	-52.2	SH	NU	NU	
SE189	9.7	ND	NU	SH	NU	NU	
SE190	10.1	ND	NU	SH	NU	NU	
SE191	9.9	ND	NU	SH	NU	NU	
SV114	9.5	NU	NU	NU	NU	NU	No LIF data
SV115	10.9	NU	NU	NU	NU	NU	No LIF data
SV116	14.3	NU	NU	NU	NU	NU	No LIF data
SV117	12.6	NU	NU	NU	NU	NU	No LIF data
SV118	12.4	NU	NU	NU	NU	NU	No LIF data
SV119	13.2	NU	NU	NU	NU	NU	No LIF data
SV121	12.5	NU	NU	NU	NU	NU	No LIF data
SV123	10.4	NU	NU	NU	NU	NU	No LIF data
SV151	13.9	NU	NU	NU	NU	NU	No LIF data
SV152	13.9	NU	NU	NU	NU	NU	No LIF data

[1]Ground surface elevation for monitoring wells is top of flush-mount casing.

Notes:
ND - not detected; no evidence of NAPL in sample descriptions/analysis or LIF response
NU - not used; indications of NAPL questionable, or data do not agree with other available information
SH - shallow; boring/push not deep enough to delineate NAPL base, or samples not collected over some upper interval

6.0 POST-FIELD-INVESTIGATION DATA GAPS AND UNCERTAINTIES

The data quality objective (DQO) process was used to develop the plan for the FY00 NAPL field investigation. Nine data gaps were identified after the FY99 NAPL investigation was completed and used to develop the FY00 NAPL investigation scope. The following sections discuss the resolution of the data gap analysis after the conclusion of the FY00 investigation and the identification of new data gaps.

6.1 EXTENT OF NAPL CONTAMINATION AT DSW-4B, DSW-6B, AND OFS-4D

The naphthalene concentrations and trends for these three wells indicated that NAPL contamination had begun to migrate beyond the McCormick and Baxter property. NAPL was also observed in soil samples collected near the DSW-6 and DSW-4 wells. DNAPL may potentially have migrated past the southern property boundary at the main gate and the southeast corner of the stormwater retention ponds at elevations ranging from –50 to –100 feet and –80 to –90 feet, respectively. There are physical accessibility problems related to collecting additional data in these areas (e.g., railroad tracks, surface street traffic, overhead utility lines, and current structures).

Twelve SCAPS CPT/LIF and six CPT microwell pushes were completed on the Union Pacific Rail Road property south of the McCormick and Baxter property line. SCAPS locations in this area were coordinated with the UPRR train operations manager to ensure that the investigation activities did not interfere with train operations along the tracks in the investigation area. The maximum depth of the LIF pushes was short of the depth required to confirm the suspected offsite migration. No LIF indicative of NAPL was measured south of the McCormick and Baxter property line. One rotosonic boring (SB-165) was completed southeast of the DSW-4 well cluster. No NAPL was detected by visual examination or in the soil chemical data to a depth of 250 feet. Due to access limitations, no additional rotosonic soil borings could be completed in the areas suspected to be locations of offsite NAPL migration. The extent of deep NAPL stringers in off-site areas southeast of the DSW-4 wells and south of DSW-6 wells is still uncertain, but is expected to be limited.

6.2 DENSITY OF SITE DATA

Although significant data have been collected for the site, there are still areas with uncertainty regarding the presence and amount of NAPL. For example, since the SCAPS was unable to push beyond 152 feet bgs, the amount of data characterizing the deepest portions of the site is sparse relative to the shallow portion of the McCormick and Baxter property (i.e., greater than –100 feet elevation). Only approximately 35 percent of the SCAPS pushes made achieved depths greater than –100 feet elevation. NAPL has been observed below –100 feet elevation. However, the relatively limited amount of deep site data and the nature of NAPL distribution at the site (e.g., thin, vertically discontinuous fingers and stringers) make it difficult to determine with precision the locations and amount of deep NAPL. Below –100 feet elevation, where the density of data is less, it is possible that some NAPL was not identified during the characterization process. Additionally, the maximum depth of NAPL at the site may not be known.

There is some uncertainty regarding the lateral extent of NAPL as indicated by the dashed portions of the NAPL boundary shown on Figure 5-41. Additional investigation opportunities in these areas were not feasible due to the proximity of operating businesses and access limitations (i.e., railroad tracks, overhead utility lines, and above ground structures). This data gap will not impact the evaluation of an in situ thermal technology for the selection of a final groundwater remedy, because the volume and location of the majority of NAPL is known.

6.3 POTENTIALLY LOW-BIASED SOIL SAMPLE CHEMICAL RESULTS

Some areas of the site may have significantly higher levels and/or quantities of contamination than have been reported. Several factors may have led to a low bias in the soil contamination analytical results.

- The field sampling team noted that free-phase NAPL was occasionally lost from some of the soil cores before the samples were containerized in jars.

- The field sampling team observed partitioning of NAPL in the sample jars, leading to heterogeneity of the soil samples. In these situations, the way in which the laboratory subsamples can dramatically affect chemical results. Evidence of this problem was documented by the high relative percent differences calculated for duplicate samples of soil samples observed to have mobile NAPL.

- Several of the soil cores were observed to have “veins” of NAPL running through them. In some situations, the field sampling team was forced to homogenize the NAPL veins and globules with the visibly less contaminated soil in the cores, effectively diluting the soil samples, in order to get a sufficient sample volume for analysis.

These factors, which can result in low bias for the soil chemical results, are still of concern for the NAPL characterization data collected during the FY00 investigation. These potential data biases should be considered when utilizing this data for decision-making purposes.

6.4 NAPL TRANSPORT NORTH OF THE MCCORMICK AND BAXTER PROPERTY

No investigation work was performed in 1999 north of the McCormick and Baxter property in Old Mormon Slough. Upland DNAPL contamination near the southern edge of the slough is present at shallow elevations ranging from 8 feet elevation to –45 feet elevation. Deeper DNAPL is also present adjacent to the slough near the Main Processing Area from elevations as deep as –60 to –160 feet. Thus, DNAPL could have migrated under the slough to the north along a broad margin and at various depths. If this migration were occurring, the extent of this contamination would need to be determined. Likely sources were the upland source areas, the NAPL in the slough sediments, or both.

This data gap was filled by exploring north of the slough and beneath the slough. Fourteen SCAPS LIF/CPT pushes were made, SCAPS soil samples were collected at four locations, and two rotosonic borings were completed on The Dutra Group and Stockton Cold Storage properties north of Old Mormon Slough during the FY00 investigation. One rotosonic boring was completed as a monitoring well (MW-3E) in the E-zone at SB-101. Based on the LIF and soil data, NAPL contamination was determined not to have extended north of the slough. Twenty-four SCAPS LIF/CPT pushes were made in Old Mormon Slough from the eastern extent to approximately 250 feet west of the western end of the McCormick and Baxter sheet pile wall. NAPL is present within nearly all of the recent unconsolidated sediments in the portion of the slough east of the Cellon Process Area. The southern half of the slough sediments near the Oily Waste Ponds are contaminated with NAPL while the remainder of the slough sediment appears to be free of NAPL. NAPL is present beneath the recent unconsolidated slough deposits in the silts and sands that are characteristic of the materials beneath the upland portion of the site. The deepest observed NAPL beneath the slough bottom extends to an elevation of –70 feet (Plate 4 and Figure 5-15). Because NAPL was present near the bottom of the SCAPS push used to define the deepest NAPL beneath the slough, deeper undetected NAPL below the slough bottom may exist. NAPL is not present on the north side of the slough. Two rotosonic borings drilled to 250 feet below ground surface (approximately –240 feet elevation) on the north side of the slough confirm that NAPL has not migrated north of the slough. Thus, slough sediment and deep NAPL contamination is limited to an area south of the northern shore of the slough.

The pattern of interpreted NAPL distribution beneath the slough (Plates 4, 9, 10, 11 and 12) is consistent with NAPL spilled in the slough as a source for deeper contamination beneath the slough. Deep NAPL beneath the slough occurs in areas where there is a low point or depression in the unconsolidated slough sediment/consolidated recent flood basin sediment interface. DNAPL may have migrated to these depressions, pooled and subsequently drained into the deeper sediments beneath the bottom of the slough. Alternatively, deep NAPL beneath the slough may have migrated from upland sources.

6.5 NAPL TRANSPORT WITHIN THE EASTERN PORTION OF THE SITE

Access to the Union Pacific property was not available for the FY99 field investigation. Consequently, the potential for NAPL migration eastward from SE-79 and SE-93 at 66 to 80.5 feet bgs (approximately –55 to –70 feet elevation), through and beyond the UPRR property, was unknown, and possible C- and D-zone NAPL contamination near the DSW-1 wells existed based on groundwater contaminant concentrations.

Twelve SCAPS LIF/CPT pushes were made on the Union Pacific property east of the McCormick and Baxter property line. Two rotosonic borings were completed to the E-zone. One E-zone monitoring well (MW-4E) was completed near the DSW-1 well cluster. NAPL was not observed beneath the UPRR property on the eastern portion of the site at any depth. However, naphthalene odor was noted in MW-4E when the well was opened to collect the E-zone groundwater sample during the groundwater monitoring program conducted in November 2000. The extent of NAPL in this area of the site is uncertain, but is expected to be limited.

6.6 CONTAMINATION ASSOCIATED WITH SE-43 AND SE-47

Two unique near-surface (less than 30 feet bgs) source areas were identified, during FY99 sampling, near the entrance to the site at SE-43 and SE-47. The same two product types were identified, during FY00 sampling, at locations SE-120, SE-122, and SE-151 (surface only). The petroleum pattern in samples collected at these locations did not match that for diesel fuel or creosote and could not be identified during the chromatogram review. The contamination found in these areas is not believed to be associated with the main creosote NAPL plume because soil contamination is shallow and is located adjacent to railroad tracks. The contamination in these areas is isolated to less than 30 feet bgs, and is not considered a significant source.

An extensive investigation (i.e., nine SCAPS LIF/CPT pushes, SCAPS soil samples collected at three push locations, and one rotosonic soil boring) was conducted around the PCP Mixing Shed during the FY00 NAPL investigation to determine if this area should be considered a PCP and NAPL source area. During the PCP Mixing Shed investigation, three SCAPS pushes and one rotosonic boring were located near SE-43 and SE-47. A strong fuel odor was detected in a soil sample collected from 7 to 9 feet bgs. The LIF wavelength signature seen in the SE-120 panel plot from 9 and 20 feet bgs was the same as that seen in SE-43. The soil sample collected at this location had no visible NAPL, however it was positive for the Sudan IV test, and had a strong fuel odor.

6.7 SUBSURFACE OBSTRUCTION AT SE-03, SE-52, AND SE-97

SCAPS encountered a subsurface obstruction during the FY99 investigation at approximately 16 feet bgs that caused refusal of further penetration at locations SE-03, SE-52, and SE-97. The Resonant Sonic drill rig was able to drill a hole near SE-52; however, this location was collocated approximately 2 feet from the original SCAPS penetration location, SE-52. It was unclear whether a natural or manmade obstruction caused the SCAPS refusal in this area. The type and characteristics of the obstruction were considered important to know, as they could affect implementation of remedial actions at the site.

A subsurface investigation was conducted during the FY00 investigation with a backhoe excavator in this area. No manmade subsurface confining structure was uncovered; however, the obstruction was determined to be very hard paleosol with abundant calcite nodules and thin roots. This paleosol is considered to be limited to the area around SE-03, SE-52, and SE-97.

6.8 PCP CONTAMINATION IN THE CELLON PROCESS AREA

The Cellon process, which was used by McCormick and Baxter, involved the use of PCP, butane, and ether for wood preservation. Crystals of almost pure PCP were found in a surface soil sample collected at EP-01 in the Cellon Process Area during the FY99 investigation. A screening VOC analysis identified a significant amount of diisopropyl ether in the surface soil collected at this location. An understanding of the extent of this potential contamination source, as well as any associated contaminant migration, was required before a final groundwater remedy is selected.

The Cellon Process Area was investigated in FY00 with SCAPS soil samples collected at five locations and analyzed for VOCs, PCP, and SVOCs. A reddish-purple non-creosote NAPL was encountered beginning at 6.5 feet bgs at SV-117, which was collocated with the EP-01 sample location. This NAPL was determined to be primarily composed of PCP and diisopropyl ether. The PCP and diisopropyl ether concentrations decreased below 40 feet bgs (approximately –30 feet elevation) at SV-117, and also laterally in sampling locations within 40 feet. Although elevated concentrations of PCP and diisopropyl ether were detected in all soil sampling locations in the Cellon process area, the NAPL was limited to a very small volume. Crystallized PCP and an ether odor were encountered in near surface soil throughout the Cellon Process Area. The Cellon Process Area is also a source of creosote NAPL, which starts to be encountered at approximately 25 feet below ground surface.

No subsurface containment structure was detected in this area during the investigation.

6.9 EXTENT OF PCP AND DIOXIN IN THE A-ZONE AQUIFER

Evaluation of groundwater data shows that PCP and dioxin are extensively found in the A-zone outside of the boundaries identified for the main NAPL plume. One possible explanation for this was a separate, unobserved NAPL carrying the PCP and dioxin in the A-zone, thus creating an associated PCP and dioxin groundwater plume. Alternatively, undefined vadose zone PCP with dioxin source areas outside of the interpreted NAPL area may have caused the observed PCP plume. These potential source areas would be acting as long-term sources to groundwater contamination in areas outside those affected by the creosote-based NAPL contamination. A third hypothesis is that PCP and dioxin are relatively more mobile in the A-zone due to unknown transport/degradation mechanisms. An understanding of the extent of shallow PCP and dioxin contamination may be required before a final groundwater remedy is selected.

Four preliminary A-zone groundwater samples were collected from A-zone monitoring wells A-3, A-4, A-5, and A-6, and analyzed for SVOCs and VOCs, including diisopropyl ether. Visible LNAPL was not detected in the four wells. Relatively low (i.e., insufficient to form an LNAPL) concentrations of diisopropyl ether was detected in two wells (i.e., A-6, located northeast of the DSW-4 cluster, and A-4, located north of the storm water retention ponds). Pentachlorophenol was detected in all four wells in concentrations ranging from 3.5 µg/L in A-3 to 1,100 µg/L in A-6. No NAPL was identified in SCAPS soil sample pushes completed adjacent to these wells. SCAPS soil sampling locations were co-located at monitoring wells A-3, A-4, A-5, and A-6. No LNAPL was observed in the soil samples collected from across the historical A-zone water table (i.e., from approximately 16 feet to 40 feet bgs or –6 to –30 feet elevation).

The PCP Mixing Shed and the Cellon Process Area were determined to be PCP source areas based on the investigations conducted in those areas. Nine SCAPS LIF/CPT pushes were made, SCAPS soil samples were collected at three locations, and one rotosonic soil boring was completed around the PCP Mixing Shed. Soil samples were collected at five locations within the Cellon Process Area. The data indicated that these areas were significant sources of PCP and diisopropyl ether contamination, however the unique diisopropyl ether/PCP NAPL was observed at only one location (SV-117) in the Cellon Process Area. Therefore, a PCP carrying LNAPL does not seem reasonable as a transport mechanism for the A-zone PCP contamination. The hypothesis that PCP could be traveling in the dissolved phase with the diisopropyl ether as a cosolvent was evaluated and determined to be unlikely.

Sixteen microwells were screened within the A1-zone sand unit along the down-gradient margin of the site and within the interior of the site. These wells will be sampled for diisopropyl ether and PCP during the first quarter of the remedial design groundwater monitoring scheduled to begin November 2000. Results from these analyses should yield information regarding the extent and sources of PCP contamination in the A1-zone sand unit of the aquifer. Natural attenuation parameters will be collected as part of the on-going remedial design groundwater monitoring. An evaluation of these parameters may help explain the relative mobility of the site COCs in the different aquifer zones.

6.10 DATA GAP CONCLUSIONS

Based on the investigation scope, which was developed to complete the FY99 investigation data gaps, and the volume and quality of the FY00 investigation data, no new data gaps were identified. In addition, the FY99 and FY00 pre-design characterization data are considered sufficient to complete the evaluation of in situ thermal technologies for the selection a final groundwater remedy.

7.0 CONCLUSIONS

The SCAPS LIF data, observations made in the field, and soil data suggest that there are four primary NAPL source areas: (1) Oily Waste Ponds Area, (2) Cellon Process Area, (3) Main Processing Area, and (4) PCP Mixing Shed. The FY00 data also suggested that NAPL has migrated away from these source areas, extending downward as well as outward to the south, west, and east. The FY00 LIF and chemical data indicates that the extent of NAPL in the eastern end of the site does not extend past push locations SE-126, SE-153, SE-124, SE/SB-154, SE-125, and SE-155. The extent of NAPL southeast of the DSW-4 wells and south of SE-97 is still uncertain but is expected to be very limited.

LIF and chemical data suggests that NAPL is present beneath Old Mormon Slough north of the Main Processing Area, but does not extend across the Slough under the Stockton Cold Storage or The Dutra Group properties. The most significant NAPL contamination under Old Mormon Slough appears to be limited to the area adjacent to the Main Processing Area. It is unclear if NAPL contamination in this area was the result of spills into the slough or NAPL transport in the subsurface from the Main Processing Area. Most likely NAPL contamination in this area is a result of transport through both pathways. LIF data confirms that contamination in the surficial slough sediments extends from the eastern end of the slough to west of the oily waste ponds.

A review of TPH-Dx analysis chromatograms identified six distinct patterns, which are identified as product types A through F in Table 5-5. The petroleum patterns A, B, E, and F did not match those for diesel fuel or creosote and could not be identified. Product types C and D contain numerous PAHs, and the chromatogram patterns closely resemble the pattern of the creosote standard.

The density of stratigraphic and contaminant data above approximately –100 feet elevation is high, and the maximum extent of NAPL above this elevation is well characterized. Below –100 feet elevation, data remain relatively sparse. Therefore, NAPL pathways and the maximum horizontal and vertical extent of NAPL below –100 feet elevation are less certain.

The interpreted maximum horizontal extent of NAPL in the subsurface is shown as a solid and dashed line in Figures 5-41 through 5-44. The dashed portion of the boundary indicates areas where NAPL is present at the property line beyond which no data, or only limited data, are available. Additional investigation opportunities in these areas were not feasible due to the proximity of operating businesses and access limitations (i.e., railroad tracks, overhead utility lines, and above ground structures). This data gap will not impact the evaluation of an in situ thermal technology for the selection of a final groundwater remedy, because the volume and location of the majority of NAPL is known.

The bulk of creosote NAPL is interpreted to be present within the A- and B-zones of the upper aquifer. The volume of space within which NAPL is interpreted to be present at the site is approximately 27,000,000 ft^3 (1,000,000 yd^3). The volume of space above an elevation of –100 feet within which NAPL is interpreted to be present is approximately 24,000,000 ft^3 (900,000 yd^3). The net thickness of creosote NAPL-contaminated soil at each boring/push was determined by adding together the intervals of observed and interpreted NAPL at each sampled location to derive a net interpreted NAPL thickness for the site (Figure 5-24). The volume of soil containing creosote NAPL is approximately 7,300,000 ft^3 (270,000 yd^3). Assuming a porosity of 0.35 and values of NAPL saturation in the pore space of 4 percent (the median of NAPL saturation data) yields an estimated volume of creosote NAPL in the subsurface of 730,000 gallons.

A subsurface investigation conducted with a backhoe excavator was completed near SE-03, SE-52, and SE-97 to determine the nature and extent of the subsurface obstruction that prevented SCAPS penetrations greater than 16 feet in that area. The subsurface obstruction was determined to be an indurated paleosol that was thickly infiltrated with thin roots.

Based on the LIF and soil sampling data, the PCP Mixing Shed is considered to be another source area. A colorless Sudan IV-positive non-creosote diesel NAPL was observed in one sample near the PCP Mixing Shed, which is located approximately 100 feet west of the site office building. Although PCP and diisopropyl ether were detected in the vadose zone confirming a release in the area, the concentrations of these compounds in soil samples were less than those measured at the Cellon Process Area. The PCP Mixing Shed is not believed to be the primary source of the PCP and diisopropyl ether contamination in the A-zone groundwater or the suspected LNAPL source.

The Cellon Process Area is a significant PCP and diisopropyl ether source area. A gelatinous brown-purple non-creosote NAPL was encountered in the vadose zone, but did not extend to the current water table. The gelatinous NAPL was encountered only in SV-117, where the highest concentrations of PCP and diisopropyl ether were also detected. This NAPL is considered to be limited to the immediate area near SV-117 as the concentrations of PCP and diisopropyl ether significantly decreased in locations as near as 10 feet away. A previously suspected confining structure was not encountered.

Naphthalene concentrations in the slough near SE-137 are elevated relative to the rest of the site. Naphthalene crystals were found in soil samples collected at SE-137 between 22 and 24 feet below the barge deck. Based on the similarity in LIF wavelength plots collected at SE-137 and SE-05 it is suspected that naphthalene concentrations are also elevated in the main process area near SE-05.

Two unique near-surface (less than 30 feet bgs) source areas were identified near the entrance to the site at SE-43 and SE-47. The petroleum pattern in samples collected at these locations did not match that for diesel fuel or creosote and could not be identified.

An LNAPL carrier for PCP and dioxin in the A-zone groundwater was not detected in the chemical data or the qualitative tests conducted on the soil samples. However, diisopropyl ether was detected in groundwater from selected A-zone groundwater wells including A-6 (14.8 µg/L) and A-4 (27 µg/L).

Based on the investigation scope, which was developed to complete the FY99 investigation data gaps, and the volume and quality of the FY00 investigation data, no new data gaps were identified. In addition, the FY99 and FY00 pre-design characterization data are considered sufficient to complete the evaluation of in situ thermal technologies for the selection a final groundwater remedy.

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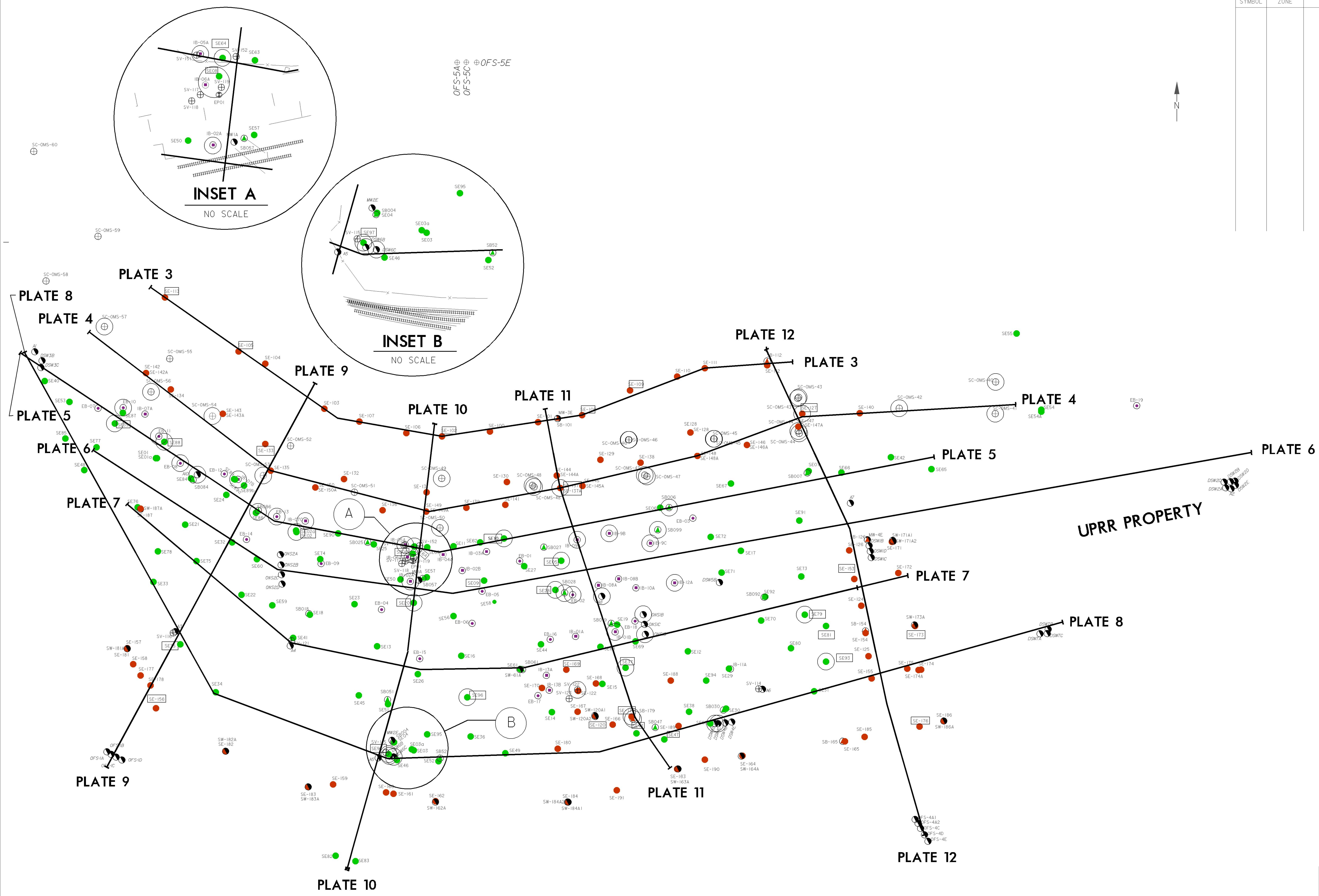
REVISIONS				
SYMBOL	ZONE	DESCRIPTION	DATE	BY



LEGEND

- SCAPS CONFIRMATION SOIL SAMPLES COLLECTED
- NAPL OBSERVED IN BORING OR SCAPS SOIL SAMPLING EVENT
- CROSS SECTION BOUNDARIES
- MONITORING WELL
- RI SLOUGH SEDIMENT CORE
- RI BORING
- FY99 SCAPS LIF & CPT PUSH
- FY99 RS BORING
- SURFACE SOIL SAMPLE
- FY00 MONITORING WELL
- FY00 SCAPS LIF & CPT PUSH OR CPT ONLY PUSH
- FY00 RS BORING
- FY00 SOIL SAMPLES (VOLATILES)

1" = 100'   100' 50' 0 100' 200'

U.S. ARMY ENGINEER DISTRICT, SEATTLE
CORPS OF ENGINEERS
SEATTLE, WASHINGTON

MC CORMICK & BAXTER SUPERFUND SITE

SITE MAP, SAMPLE LOCATIONS, AND CROSS SECTION LOCATIONS

STOCKTON CALIFORNIA

SIZE	INVITATION NO.	FILE NO.	DATE:	PLATE
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DSGN. SMITH		CHK. LYNCH	SHEET	

This project was designed by the Seattle District U.S. Army Corps of Engineers. The initials or signatures and registration designations of individuals appear within the specifications or on these project documents within the scope of their employment as required by ER 1110-1-8152, Professional Registration.

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Computer Aided Design & Drafting